5-3805-251-12/991

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

LOADER, SCOOP TYPE, DED, 4 WHEEL DRIVE, PNEUMATIC TIRED, HINGED FRAME STEER, 2½ CU. YD. MULTI-PURPOSE BUCKET (J.I. CASE MODEL MW24B) FSN 3805-169-4711

This copy is a reprint which includes current pages from Changes 1 through 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1973

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WARNING

BEFORE OPERATION:

Keep equipment free of oil, grease, and dirt to be sure of proper control.
Do not smoke or use an open flame when charging batteries. Batteries generate hydrogen, a highly explosive gas.
Make sure fire extinguisher is on loader.
Check loader before starting. Be sure area is clear of personnel before moving loader. Sound horn before moving loader.
Do not move loader if low air pressure buzzer is sounding. Wait until air pressure gage indicates 75 to 125 psi.
Remove cold weather starting aid cylinder when loader is to be operated in warm climates to prevent inadvertent injection of fluid into engine.
Do not crank engine more than 30 seconds continuously without allowing a two-minute cooling off period.

DURING OPERATION:

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or plugs which were fitted by a trained professional.
Do not operate loader indoors unless area is well ventilated.
Report or correct any operating condition that could result in injury to personnel or damage to the machine if operation is continued.
Operate machine at speeds consistent with conditions of a particular job.
Do not use bucket as a brake.
Do not get on or off the loader while it is in motion. Never permit anyone to ride on the outside of loader.

DURING OPERATION:

Never downshift from high range to low range at speeds in excess of 5 mph.

AFTER OPERATION:

Always lower bucket to the ground when loader is not in use. Place all levers in neutral position.
Set parking brake when parking loader. Block loader wheels when parking on an incline.
Report or correct any condition which could result in injury to personnel or damage to the machine.
Stop machine and shut off engine before lubricating, adjusting, or servicing.
Disconnect the battery ground cable before servicing any electrical system component.

EMERGENCY TOWING:

Do not attempt to start loader engine by towing. Use auxiliary power source and slave receptacle to start engine.
The loader is not designed to be a towing vehicle. If used as such, hydraulic system oil may become extremely overheated. This could cause damage to hydraulic components or hoses.
If loader must be used as a tow vehicle for any sustained period, move hydraulic controls periodically to circulate oil throughout the hydraulic system and reduce the possibility of overheating.
If loader is to be towed, disconnect propeller shafts to prevent damage to transmission and hydraulic system.

CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 2 August 1990

Operator and Organizational Maintenance Manual
LOADER, SCOOP TYPE, DED 4-WHEEL DRIVE, PNEUMATIC TIRED, HINGED FRAME STEER, 2-1/2 CU. YD. MULTIPURPOSE BUCKET
(J.I. CASE MODEL MW24B)
(NSN 3805-00-169-4711)

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B-1 through B-6	B-1 through B-14

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The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25-E (Block 1576) Operator and Unit maintenance requirements for TM5-3805-251-12.

WARNING

BEFORE OPERATION:

Keep equipment free of oil, grease, and dirt to be sure of proper control.
Do not smoke or use an open flame when charging batteries. Batteries generate hydrogen, a highly explosive gas.
Make sure fire extinguisher is on loader.
Check loader before starting. Be sure area is clear of personnel before moving loader. Sound horn before moving loader.
Do not move loader if low air pressure buzzer is sounding. Wait until air pressure gage indicates 75 to 125 psi.
Remove cold weather starting aid cylinder when loader is to be operated in warm climates to prevent inadvertent injection of fluid into engine.
Do not crank engine more than 30 seconds continuously without allowing a two-minute cooling off period.

DURING OPERATION:

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or plugs which were fitted by a trained professional.
Do not operate loader indoors unless area is well ventilated.
Report or correct any operating condition that could result in injury to personnel or damage to the machine if operation is continued.
Operate machine at speeds consistent with conditions of a particular job.
Do not use bucket as a brake.
Do not get on or off the loader while it is in motion. Never permit anyone to ride on the outside of loader.

DURING OPERATION:

Never downshift from high range to low range at speeds in excess of 5 mph.

AFTER OPERATION:

Always lower bucket to the ground when loader is not in use. Place all levers in neutral position.
Set parking brake when parking loader. Block loader wheels when parking on an incline.
Report or correct any condition which could result in injury to personnel or damage to the machine.
Stop machine and shut off engine before lubricating, adjusting, or servicing.
Disconnect the battery ground cable before servicing any electrical system component.

EMERGENCY TOWING:

Do not attempt to start loader engine by towing. Use auxiliary power source and slave receptacle to start engine.
The loader is not designed to be a towing vehicle. If used as such, hydraulic system oil may become extremely overheated. This could cause damage to hydraulic components or hoses.
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If loader is to be towed, disconnect propeller shafts to prevent damage to transmission and hydraulic system.

TM 5-3805-251-12
C 2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
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Operator and Organizational Maintenance Manual
LOADER, SCOOP TYPE, DED, 4-WHEEL DRIVE, PNEUMATIC TIRED, HINGED FRAME STEER, 2½ CU YD. MULTI-PURPOSE BUCKET (J. I. CASE MODEL MW24B)
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3-7 and 3-8	3-7 and3-8
4-1 and 4-2	4-1 and 4-2
4-17 through 4-20	4-17 through 4-20
4-27 and 4-28	4-27 amd4-28

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No. 1

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Operator's and Organizational Maintenance Manual
LOADER, SCOOP TYPE, DED., 4-WHEEL DRIVE PNEUMATIC TIRED, HINGED FRAME STEER, 2 1/2 CU. YD. MULTIPURPOSE BUCKET (J.I. CASE MODEL MW24B)
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1-7 through 1-10	1-7 through 1-10

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TECHNICAL MANUAL
No. 5-3805-251-12

HEADQUARTERS,
DEPARTMENT OF THE ARMY
Washington, D.C., *30 October 1978*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

LOADER, SCOOP TYPE, DED, 4 WHEEL DRIVE, PNEUMATIC TIRED, 2½ CU. YD. MULTI-PURPOSE BUCKET (J.I. CASE MODEL MW24B) FSN 3805-169-4711

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1.Scope

a. This manual contains instructions for use and maintenance of the MW24B Scoop Loader. It includes procedures for Operator and Organizational levels of maintenance for the equipment and its accessories.

b. Appendix A contains a list of publications to be used in conjunction with this manual. Appendix B contains the Maintenance Allocation Chart. Appendix C contains the Basic Issue Items List.

c. Preparation, care and removal of equipment in administrative storage will be in accordance with the applicable requirements of TM 740-90-1 (Administrative Storage of Equipment).

d. Instructions for destruction of materiel to prevent enemy use will be in accordance with TM 750-244-3 (Procedures for Destruction of Equipment to Prevent Enemy-Use).

1-2. Forms and Records

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA Pam 738-750.

1-3. Equipment Serviceability Criteria

Deleted.

1-4. Reporting Errors and Recommending Improvements

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA 2028 *(Recommended Changes to Publications and Blank Forms)* direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

Section II. DESCRIPTION AND DATA

1-5. Description

a. The J.I. Case Company Model MW24B Scoop Loader (fig. 1-1 and 1-2) is a rubber tired, four wheel drive loader, powered by a 6-cylinder diesel engine. The loader has articulated steering and is equipped with a 2½ cubic yard multipurpose bucket. The maintenance paragraphs of this manual contain detailed descriptions of its components.

b. Throughout this manual the terms, right, left, front and rear with respect to the loader and its components are determined from the view point of the operator sitting in the seat of the loader. Because the loader engine is installed facing the rear of the loader, making engine component location just the opposite of the general terms, components will be located by reference to radiator end, flywheel end, oil cooler side and fuel filter side.

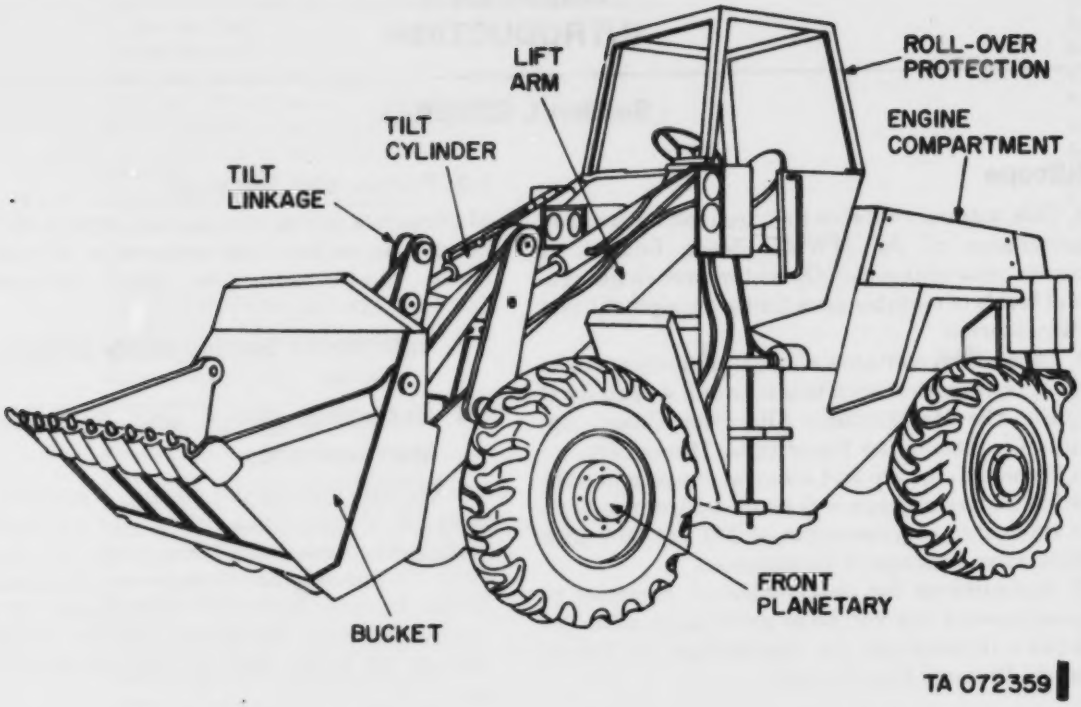

Figure 1-1. Loader, scoop-type, MW24B, front three quarter view.

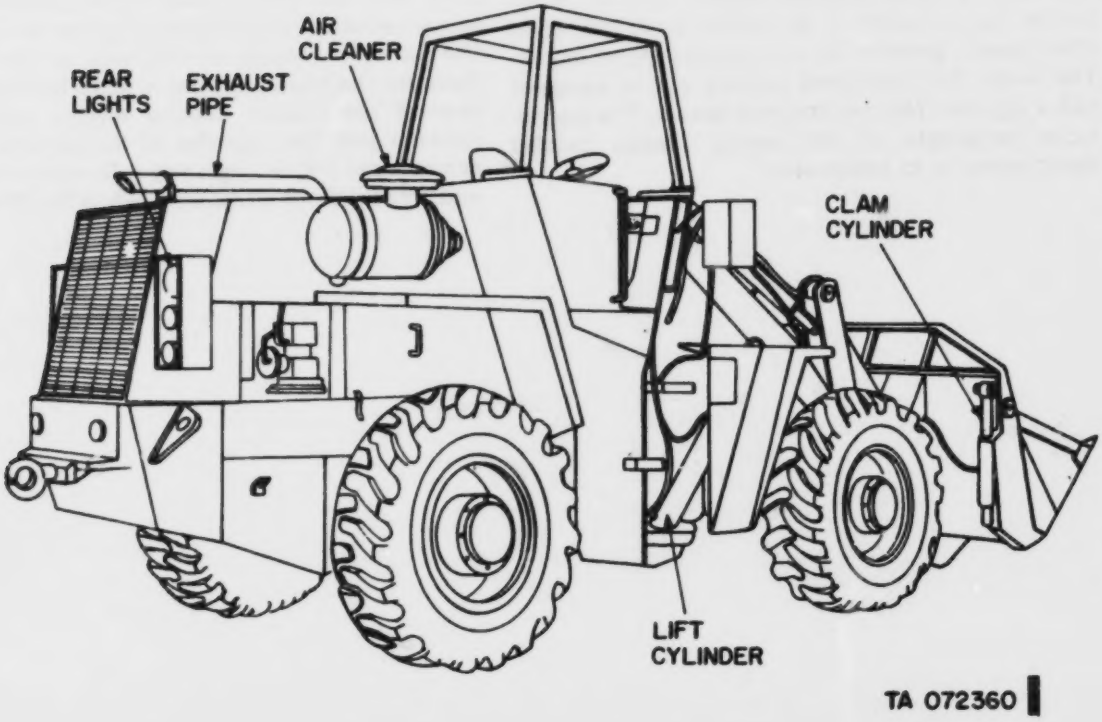

Figure 1-2. Loader, scoop-type, MW24B, rear three quarter view.

1-6. Differences Between Models

This manual covers the Model MW24B Scoop Loader only, No known difference exists within this model.

1-7. Tabulated Data

a. Identification. The loader has seven major identification plates.

(1) The Army data plate is located on the right side of the interior of the operator's compartment. It gives the model, stock, contract, registration and serial numbers as well as dimensional criteria and shipping weight.

(2) The transportation data plate, located on the right front fender, gives shipping information.

(3) The master maintenance plate, located on the left fender, gives maintenance lubrication instructions.

(4) Two safety plates located on the front end of the right rear frame provide precautionary information pertinent to the safety of personnel.

(5) The fuel injection pump plate is located on the right side of the pump and gives model and serial numbers.

(6) The transmission data plate, located on the lower left side of the transmission, gives the model and serial number.

(7) The air compressor data plate is located on the right hand side of the compressor and gives serial and model number.

b. Tabulated Data.

(1) *Loader.*

Manufacturer	J.I. Case Company
Model	MW24B
Serial number range	9110701 - 9110900

(2) *Engine.*

Make	J.I. Case Company
Model	A504 BDT
Series	B
Type	Diesel, turbocharged
Cycles	4
Number of cylinders	6, in line
Bore	4.625 inches
Stroke	5.000 inches
Horsepower	157 hp at 2200 rpm
Injector size	9.5 millimeters
Compression ratio	16.5:1
Power	180 horsepower at 2200 rpm
Lubricant capacity	17 quarts (19 quarts w/filter change)

(3) *Air cleaner.*

Make	Donaldson
Model	FWG-14-0054
Type	Dry air

(4) *Oil filter.*

Type	Pleated paper, Class 3
Make	Purolator
Housing number	A65152
Element number	60861

(5) *Fuel filter.*

(a) Primary.

Type	Edge Type, Type II, Class I
Make	Purolator
Element number	6663116

(b) Secondary.

Type	Edge Type, Type II, Class II
Make	Purolator
Element number	6663000

(6) *Fuel injection pump.*

Type	In line
Make	Robert Bosch

(7) *Governor.*

Type	Centrifugal
Make	Robert Bosch Corp.
Model	EP/RSV875-1100A2B
Setting	2200 rpm

(8) *Starter.*

Type	Heavy duty (250)
Capacity	24 volts
Make	Delco-Remy
Model	1113949

(9) *Turbocharger.*

Type	Fixed orifice
Make	Garret Corp.
Model	408310-2
Boost ratio	2.2:1 at rated rpm
Maximum recommended turbine speed	140,000 rpm

(10) *Radiator.*

Type	Heavy duty fin and tube
Capacity	48 quarts
Make	General
Pressurization	7 psi

(11) *Fan.*

Type	Blower
Diameter	22 inches
Number of blades	6

(12) *Water pump.*

Type	Centrifugal vane
Make	J.I. Case
Model	A62974
Drive	Belt
Rating	100 gpm at 2200 engine rpm
Speed as installed	2580 rpm

(13) *Thermostat.*

Type	Metal expansion
Make	Robert Shaw-Fulton
Model	I-1700-A2
Temperature rating	Open 202°F Closed 179°F

(14) *Transmission.*

Type	Powershift
Make	Allison
Model	TT2421-1
Lubricant capacity	40 quarts
Speed range:	
Forward	
1st	0 to 3.0 mph
2nd	0 to 7.0 mph
3rd	0 to 11.5 mph
4th	0 to 23.0 mph
Reverse	
1st	0 to 4.0 mph
2nd	0 to 9.0 mph

(15) *Torque converter.*

Make	Allison
Model	TT425 Twin tubine - integral with transmission
Torque input at 2200 rpm:	
Rated	310 pound-feet
Actual	276 pound-feet
Speed	2200 rpm
Power input:	
Rated	175 hp
Actual	119 hp
Stall torque ratio	5.1 to 1

(16) *Final drive.*

Number of driving wheels:	
Front	2
Rear	2
Type drive	Planetary gear
Final drive gear ratio	18.151 to 1

(17) *Wheel brakes.*

Type	Air over hydraulic
Make	Wagner Electric
Model	FR-3
Number of brake drums	4
Brake drum diameter	16-15/16 inches
Brake lining width	4.0 inches
Brake chamber volume	84.8 cubic inches
Brake actuator capacity	1 pint

(18) *Parking brakes.*

Type	Expanding shoe
Make	Rockwell Standard
Model	DLM-13-55
Actuating	All wheels
Control type	Air
Control location	Operator's compartment

(19) *Air compressor.*

Type	Twin piston
Make	Bendix Westinghouse
Type Drive	Bel
Capacity	7.14 cfm at 1250 rpm
Location	Right rear access

(20) *Steering gear.*

Type	Hydrostatic
Make	Ross Gear and Tool Co.
Model	HGB24
Location	Front chassis

(21) *Hydraulic tank.*

Make	J.I. Case
Tank capacity	20.8 gallons
Filler location	Tank top

(22) *Hydraulic pressure relief valve.*

Type	Pilot operated
Make	Parker-Hannifin
Piston size	0.312 inch
Pressure setting	2300 +0 −50 psi

(23) *Hydraulic pump.*

Type	Gear - transmission - tandem
Make	Commercial Shearing
Model	P-50B299B10522-53JFAB10-1
Drive	Gear-converter driven
Drive ratio, engine to pump	1
Capacity, steering:	
Rated	23.6 gpm at 2200 rpm with 2000 psi
Capacity, loader hydraulics:	
Rated	52 gpm at 2200 rpm with 2000 psi
Pump inlet pressure gage:	
Make	Stewart Warner
Model	360FS
Range	0 to 30 psi
Location	Instrument panel

(24) *Hydraulic oil filter.*

Make	Marvel Eng. Co.
Element number	M3291A5125

(25) *Tires.*

Type	Tubeless
Make	Firestone
Size	17.5 x 25 inches
Ply rating	12
Operating pressure	45 psi
Tread	Directional

(26) *Battery.*

Number	2
Size	6 TN
Volts	12
Make	Prestolite
Rating	100 amps
Number of plates	23

(2) *Alternator.*

Type	Marine-splash proof
Volts	24
Rating	45 amps
Make	Niehoff
Model	N1025-1
Ground	Negative
Drive	Belt
Control:	
Type	Transistor
Make	Niehoff
Reverse polarity protection	Case

(28) *Horn.*

Type	Air-electrically actuated
Make	Sparton
Model	AH-5A

(29) *Engine oil pressure gage.*

Make	Stewart Warner
Model	306BA
Range	0 to 80 psi
Location	Instrument panel

(30) *Engine temperature gage.*

Make	Stewart Warner
Model	311BZ
Range	100° to 240° F.
Location	Instrument panel

(31) *Engine hourmeter.*

Type	Digital, electric
Actuated by	Alternator
Make	John W. Hobbs
Model	M5617
Location	Hood

(32) *Voltmeter.*

Make	Stewart Warner
Model	Q14266
Normal operating voltage	22 to 28-1/2 volts
Location	Instrument panel

(33) *Torque converter temperature gage.*

Make	AC Spark Plug
Model	TG6490643
Range	100° to 360° F.
Location	Instrument panel

(34) *Clutch pressure gage.*

Make	Stewart Warner
Model	345M
Range	0 to 300 psi
Location	Instrument panel

(35) *Air pressure gage.*

Make	Stewart Warner
Model	360FR
Range	0 to 150 psi
Normal operating pressure	105 to 125 psi
Location	Instrument panel

(36) *Fuel tank.*

Capacity	74 gallons
Location	Rear frame

(37) *Physical and functional dimensions.*

Overall length	291 inches
Overall height:	
w/o Rops	106 inches
w/Rops	129 inches
Overall width	102 inches
Shipping volume:	
w/o Rops	1860 cubic feet
w/Rops	2300 cubic feet
Shipping weight (dry)	25,100 pounds
Shipping tonnage	12.5 tons
Front axle load (wet)	12,100 pounds
Rear axle load (wet)	13,600 pounds
Operating weight	25,700 pounds
Overall bucket width	102 inches
Tread width	77 inches
Width across tires	95 inches
Bucket capacity SAE	2.5 cubic yards
Number of bucket teeth	9
Bucket weight with teeth	2,850 pounds
Maximum dumping height, center line of hinge pin to ground	145.0 inches
Maximum reach (45 degree dump angle) dumping at maximum lift (at cutting edge)	43 inches
Digging depth below ground level, bucket at 10 degrees digging angle	17 inches
Tilt back from horizontal at ground level	46 degrees
Lifting capacity to specified hinge pin height	14,000 pounds at 8.0 feet
Cutting edge clearance when dumped at 45 degrees at maximum lift	101 inches
Turning clearance diameter:	
Right turn	39.0 feet
Left turn	39.0 feet
Articulation:	
Right	40 degrees
Left	40 degrees

(39) *Torque data.*

Special Torques	
Camshaft nut	95 to 105 foot-pounds
Connecting rod bolts	95 to 105 foot-pounds
Crankshaft pulley bolt	100 to 110 foot-pounds
Cylinder head bolts	180 to 190 foot-pounds
Cylinder head valve cover stud nut	65 to 70 inch-pounds
Flywheel to crankshaft bolts	180 to 190 foot-pounds
Fuel injector clamp capscrew	20 foot-pounds
Fuel injector pressure adjusting screw locknut	70 to 75 foot-pounds
Fuel pump drive hub nut	43 to 50 foot-pounds
Fuel pump timing pointer screws	60 to 70 foot-pounds
Intake and exhaust manifold stud nut	25 to 30 foot-pounds
Main bearing cap bolts	145 to 155 foot-pounds
Oil pan capscrew	13 to 17 foot-pounds
Oil pump suction tube nut	95 to 105 foot-pounds
Water pump and fan shaft nut	60 to 70 foot-pounds
Drive flange	600 to 700 foot-pounds
U-joint spider bolts	30 to 40 foot-pounds
Planetary cover bolts	50 to 55 foot-pounds
Wheel mountings	365 to 400 foot-pounds

Table 2-1. General Torques

Bolt Size (Inches)	Grade 5 Dry (foot-pounds)	Grade 5 Lubricated (foot-pounds)	Grade 8 Dry (foot-pounds)	Grade 8 Lubricated (foot-pounds)
1/4	8-10	6-7	12-14	9-10
5/16	17-19	13-14	24-26	18-20
3/8	30-35	23-25	45-50	34-36
7/16	50-55	35-40	70-80	55-60
1/2	75-90	55-65	110-120	80-90
9/16	110-120	80-90	150-170	110-130
5/8	150-180	110-130	220-240	170-180
3/4	260-300	200-220	380-420	280-320
7/8	400-440	300-320	600-660	460-500
1	580-640	440-480	900-1000	680-740
1 1/8	800-880	600-660	1280-1440	960-1080
1 1/4	1120-1240	840-920	1820-2000	1360-1500
1 3/8	1460-1680	1100-1260	2380-2720	1780-2040

Table 2-1. General Torques – Continued

Bolt Size (Inches)	Grade 5 Dry (foot-pounds)	Grade 5 Lubricated (foot-pounds)	Grade 8 Dry (foot-pounds)	Grade 8 Lubricated (foot-pounds)
1 1/2	1940-2200	1460-1640	3160-3560	2360-2660

NOTE

These values apply to fasteners as received from supplier, dry, or when lubricated with normal engine oil. They do not apply if special graphited or molydenum disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads.

(39) *Wiring diagram.* See figure 1-3.

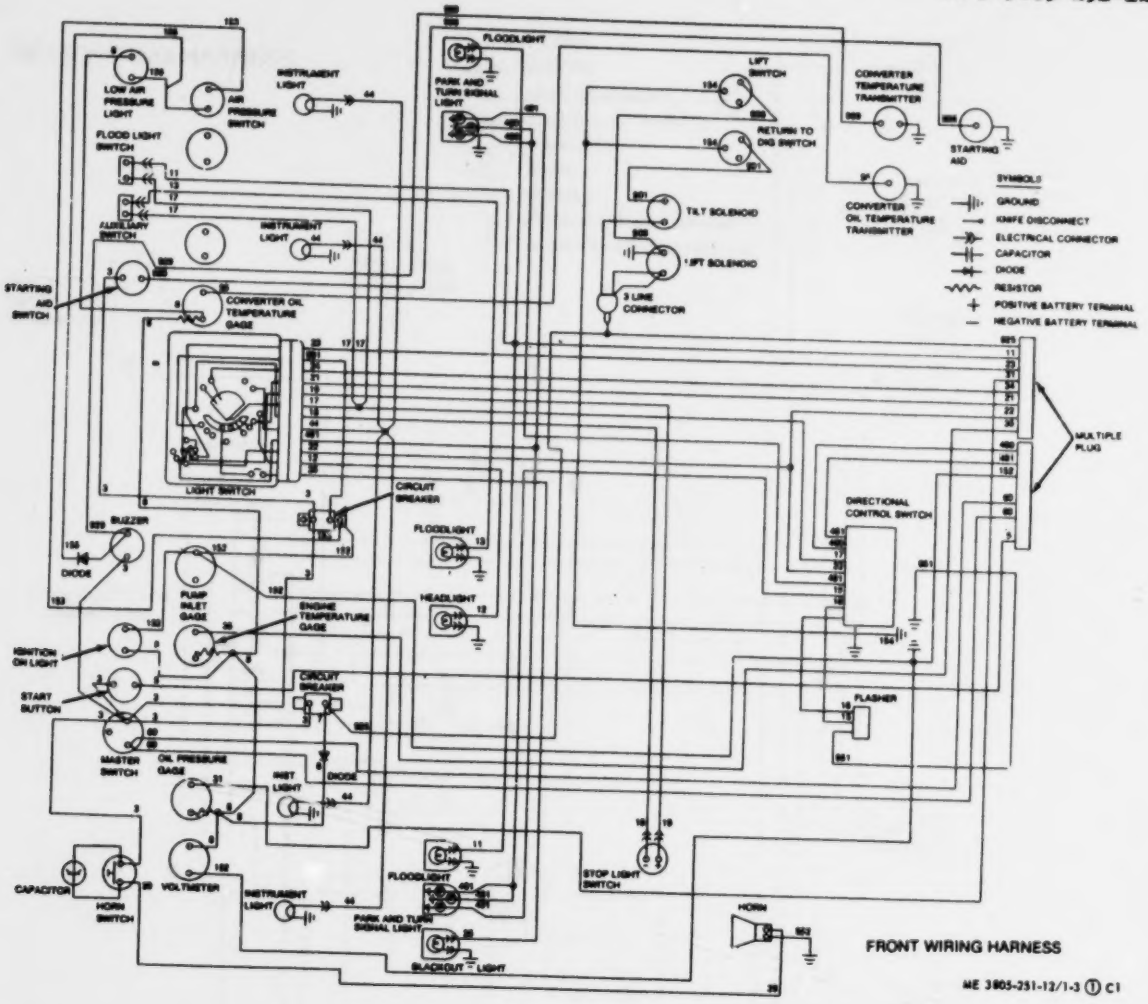

Figure 1-3. Wiring diagram (Sheet 1 of 3).

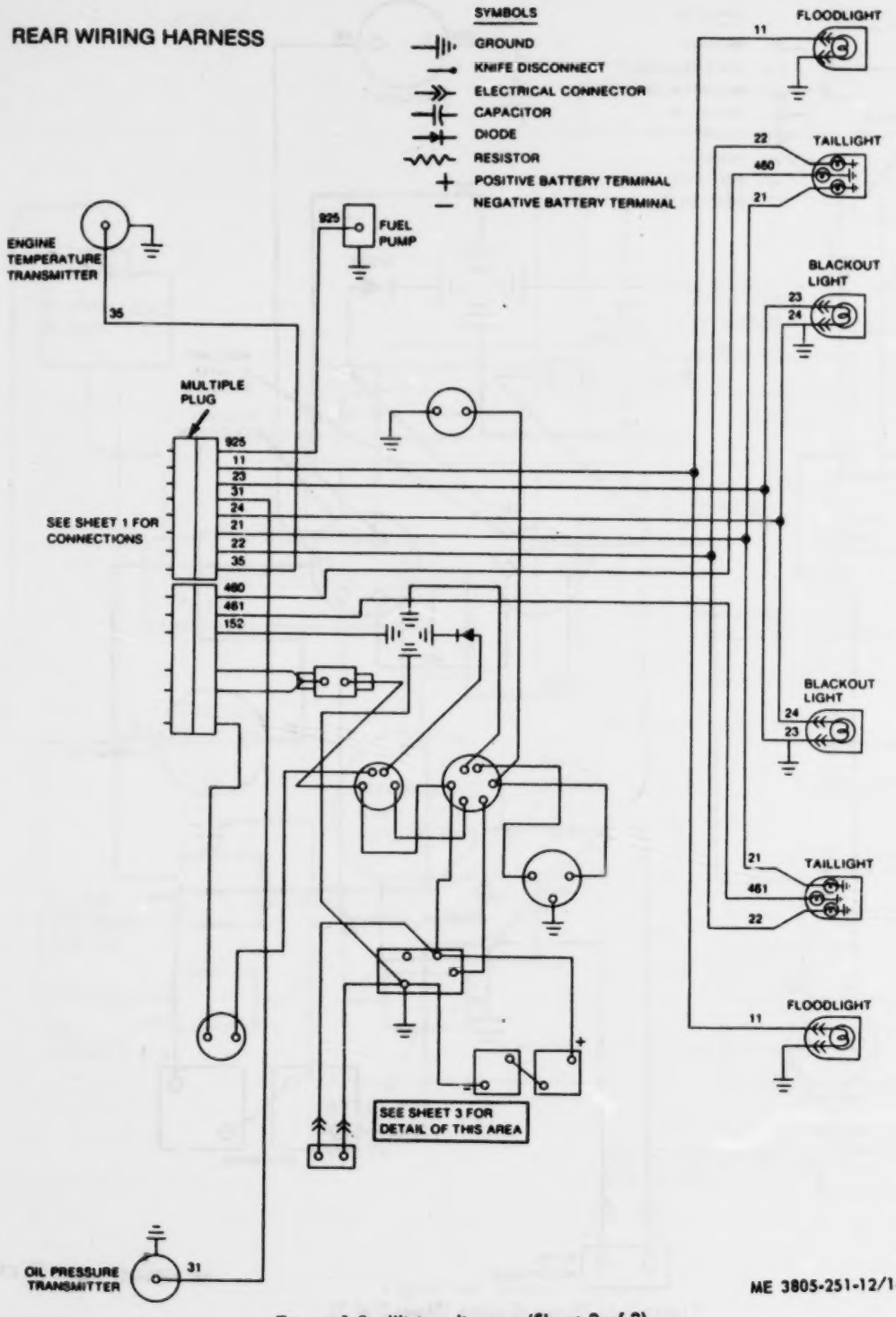

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Figure 1-3. Wiring diagram (Sheet 2 of 3).

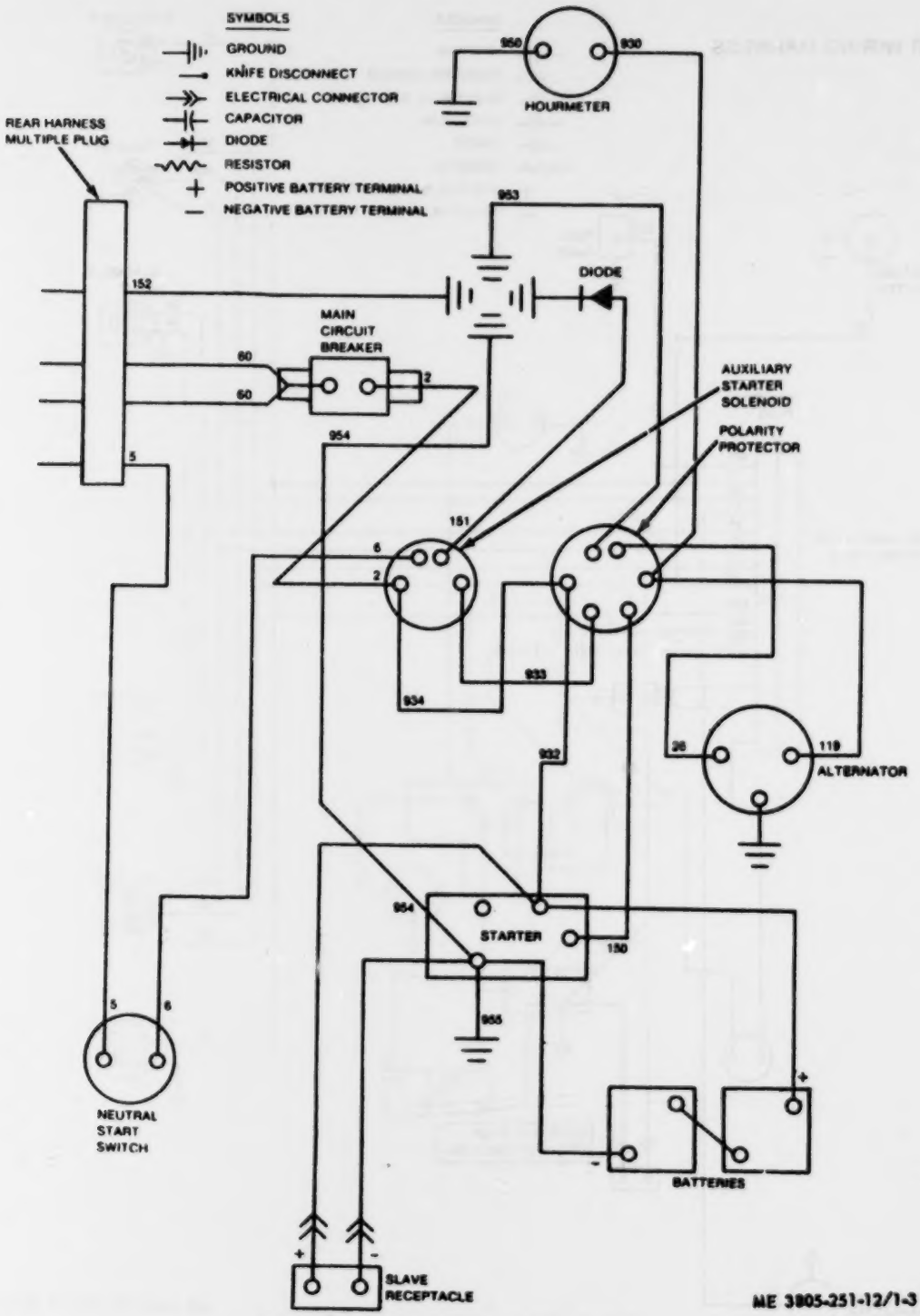

Figure 1-3. Wiring diagram (Sheet 3 of 3).

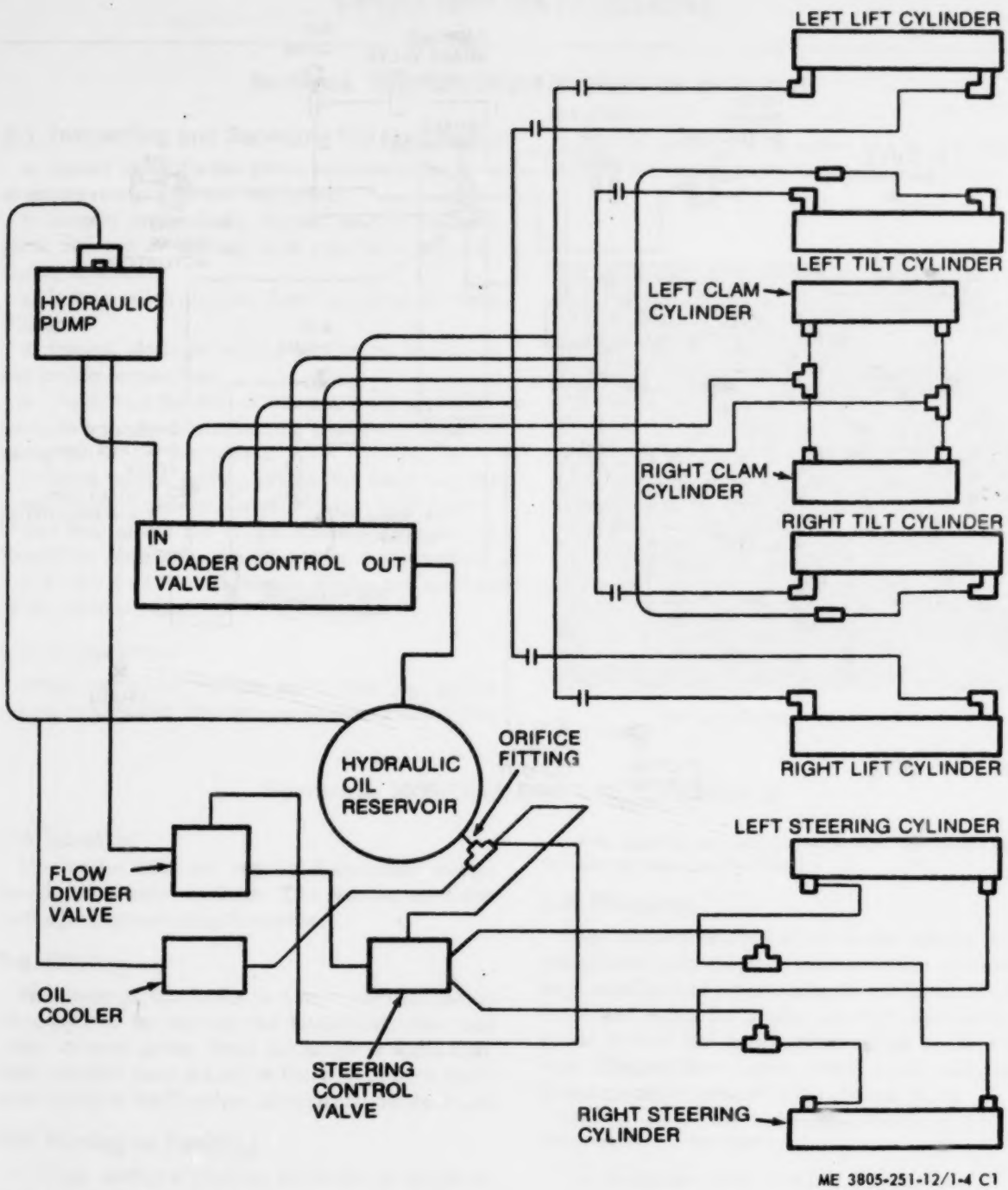

Figure 1-4. Hydraulic diagram.

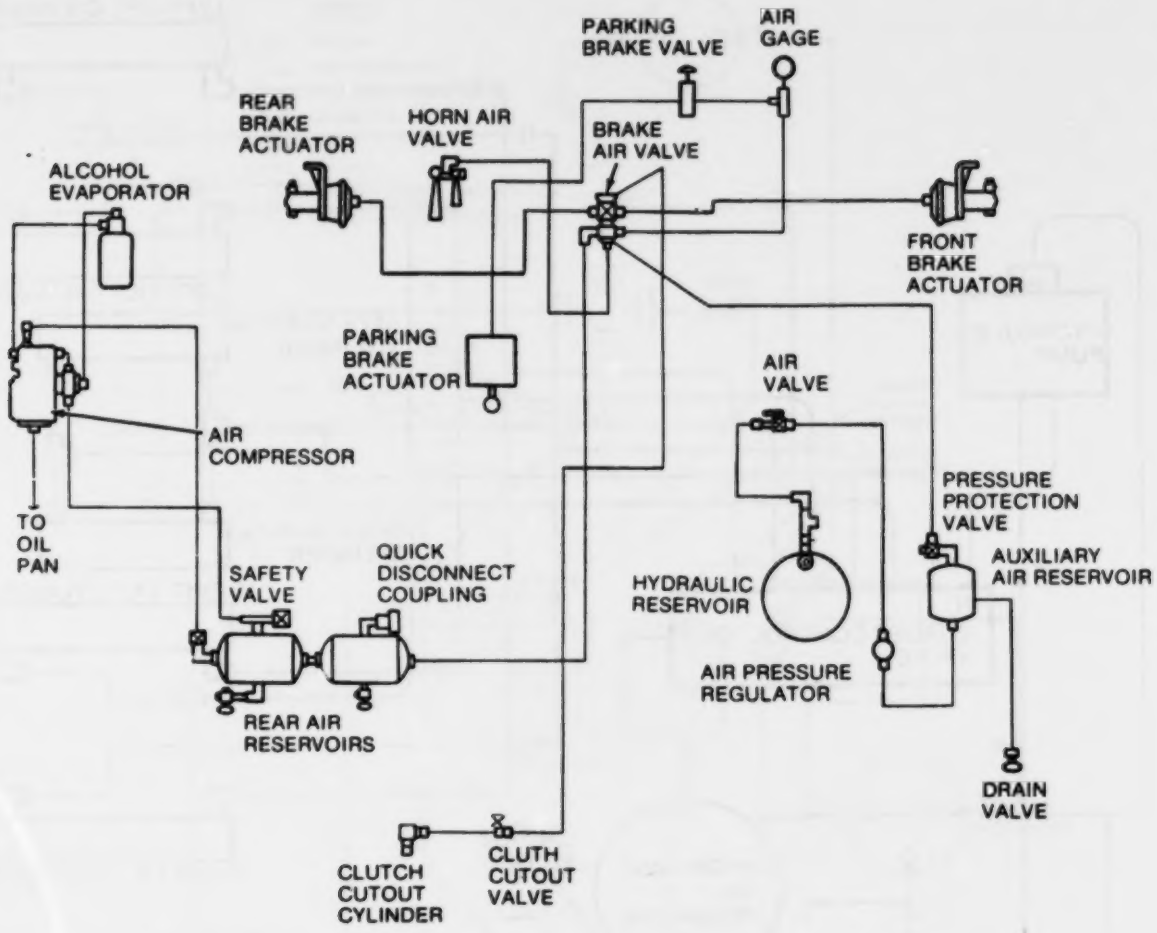

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Figure 1-5. Air system diagram.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

2-1. Inspecting and Servicing the Equipment

a. Inspect identification plates and receipt invoices to ensure receipt of proper equipment.

b. Inspect loader body, frame, and all external parts for loss or damage that may have occurred during shipment.

c. Inspect all hydraulic lines for leaks or loose fittings.

d. Inspect electrical wiring for frayed insulation and broken connections.

e. Check and tighten as necessary all accessible nuts, bolts and other attaching hardware. Refer to paragraph 1-7 for torque data.

f. Check engine cooling system for leaks and for proper coolant mixture. Correct coolant level is within one inch of the top of the radiator. Refer to TB 750-651 for cooling system maintenance instructions.

g. Perform daily maintenance checks and services as described in paragraph 3-5.

2-2. Installation

Before operation, position safety link (fig. 2-1) in the stowed position. Remove pin attaching safety link to front of loader. Swing safety link to rear and install pin to position safety link in stowed position.

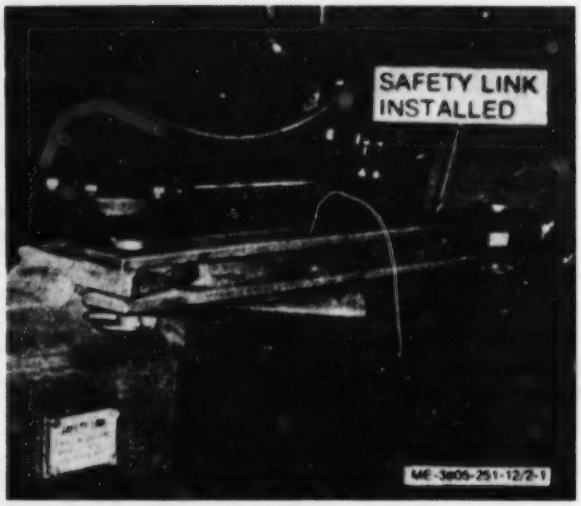


Figure 2-1. Safety link lock position.

Section II. MOVEMENT TO A NEW WORKSITE

2-3. General

The loader does not require dismantling before moving to a new worksite. This section describes methods of transporting the loader.

2-4. Driving

Movement of the loader to a new worksite can be accomplished by moving the loader over the road under its own power. Since the loader is wider than most vehicles, care should be taken to provide clearance for other traffic when traveling on public roads.

2-5. Towing or Pushing

a. When towing or pushing the loader for distances less than 1/2 mile, the drive lines may be left connected if the loader is transported at low speed.

b. When towing or pushing the loader for distance greater than 1/2 mile or at speeds over 10 MPH refer to organizational maintenance personnel to disconnect front and rear drive line shafts at the differential to prevent damage to transmission and hydraulic system.

Note. Seal the exhaust pipe to prevent autorotation of the turbocharger caused by wind velocity.

2-6. Shipping

Long distance moving of the loader should be accomplished with suitable transportation equipment such as a flat bed truck trailer or a railroad car. Tiedown and block the loader securely. For tiedowns faired toward the rear, attach cables or chains to rear lifting-tiedown eyes, pintle hook, and lower frame members forward of the steering joing.

Note. Seal exhaust pipe to prevent autorotation of the turbocharger caused by wind velocity.

a. Install the safety link (fig. 2-1) as shown.

b. Install protective covers on the air cleaner intake, fuel filler cap, breathers, alternator, alternator regulator, hydraulic fill cap and hydraulic cylinder rods.

c. Place a tag on the steering wheel indicating that the above services have been performed and instructing the operator to remove the protective covers and safety bar.

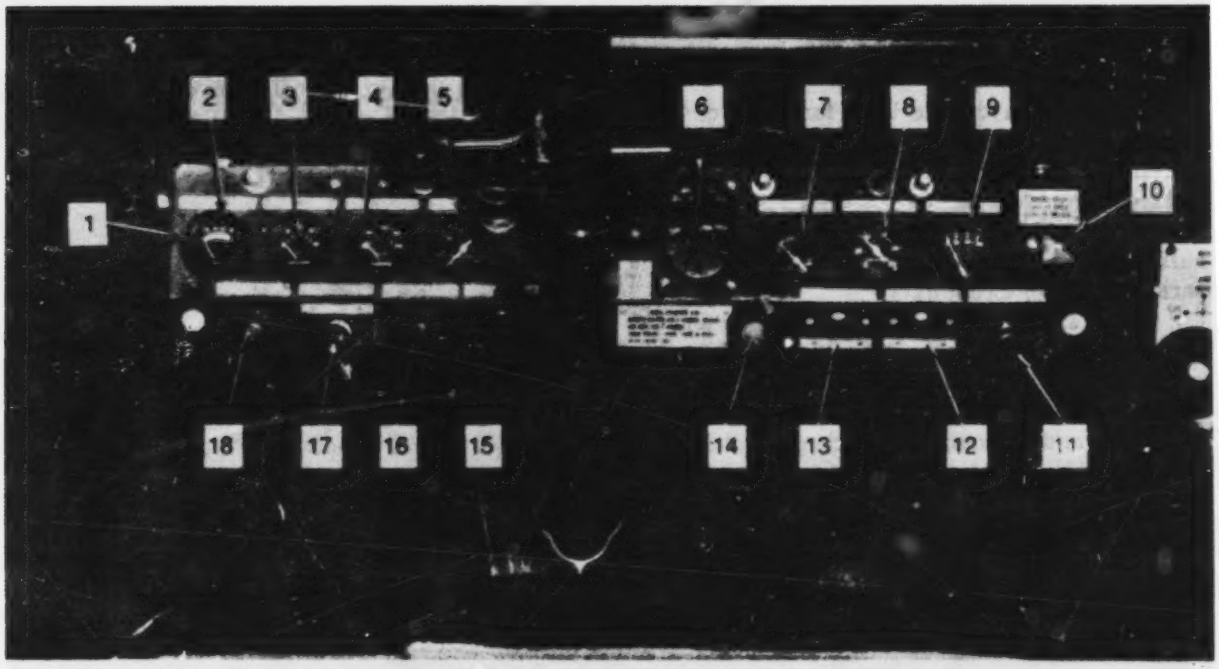
Section III. CONTROLS AND INSTRUMENTS

2-7. General

This section describes the various controls and instruments and provides the operator/crew necessary information to properly operate the loader.

2-8. Controls and Instruments

Refer to figures 2-2 through 2-5 for the location and description of all controls and instruments.



1 VOLTMETER. Indicates the condition of the batteries. Normal reading is 22 to 28-1/2 volts. The needle fluctuates slightly with drain on the electrical system and with battery condition.

2 PANEL LIGHTS. Four lights illuminate the instrument panel. See the master light switch (fig. 2-3) for operation.

3 OIL PRESSURE GAGE. Indicates the engine lubrication system oil pressure. Normal operating pressure is 45 to 55 psi.

4 ENGINE TEMPERATURE GAGE. Indicates the engine coolant temperature. Normal operating temperature is 179° F to 210° F.

5 HYDRAULIC OIL PUMP INLET GAGE. Indicates pressure of hydraulic oil as it enters the hydraulic pump. Normal operating pressure is 12 to 14 psi. Idling pressure is 13 to 19 psi.

6 MASTER LIGHT SWITCH. Refer to figure 2-3 for details and operation.

7 CONVERTER TEMPERATURE GAGE. Indicates the torque converter oil temperature. Normal gage reading is in the green zone (250° to 360° F).

8 AIR PRESSURE GAGE. Indicates the air pressure in the brake system. Normal operating pressure is 105 to 125 psi.

9 CLUTCH PRESSURE GAGE. Indicates the hydraulic clutch oil pressure. Normal operating pressure is 145 to 180 psi. When the brake pedal is applied and the transmission is in low forward range, the needle registers 0 psi.

10 PARKING BRAKE VALVE. Operates parking brake. Pull knob out to set brake, push knob in to release brake.

11 FUEL SHUTOFF CONTROL. A push-pull type cable that stops the flow of fuel to the injection pump before the engine is shut down.

12 FLOODLIGHT SWITCH. An on-off type switch that actuates the floodlights.

13 AUXILIARY FLOODLIGHT SWITCH. An on-off type switch that activates the auxiliary floodlight.

14 COLD STARTING AID SWITCH. A push button switch that activates the cold start cylinder.

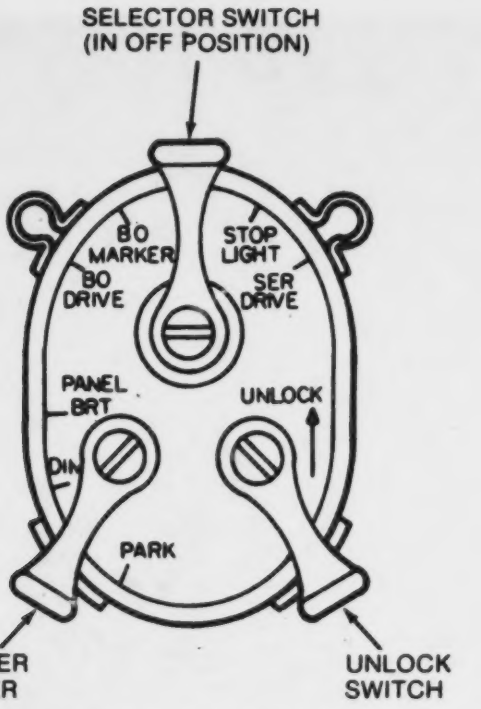
15 IGNITION INDICATOR LIGHT. A light which illuminates to indicate positive electrical current in the system.

16 START BUTTON. A push button switch that activates the starting motor.

17 MASTER SWITCH. A toggle switch that activates the loader electrical system.

18 HORN BUTTON. A push button switch that activates the horn.

Figure 2-2. Instrument panel.



1. Place selector switch in "BO DRIVE" to operate blackout head and taillights for blackout driving.
2. Place selector switch in "BO MARKER" for parking lights operation in blackout conditions.
3. Place selector switch in off position to deactivate all vehicle lights.
4. Place selector switch in "STOP LIGHT" to operate vehicle stop lights, turn signal lights, parking and panel lights.
5. Place selector switch in "SER DRIVE" to operate vehicle head and taillights, signal lights, and floodlights.
   Note. To place selector switch in "SER DRIVE" lift unlock switch to unlock position.
6. Place lower lever in positions indicated to operate panel lights and parking lights.

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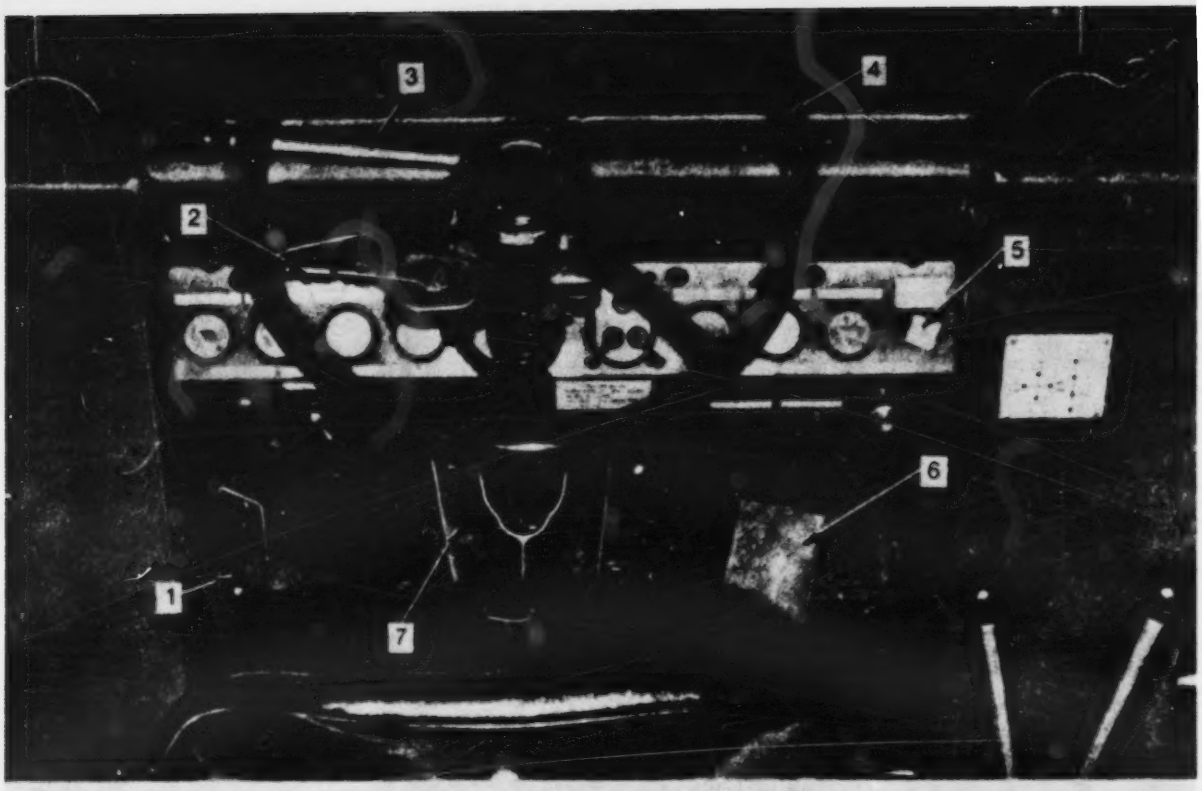
Figure 2-3. Master light switch operation.



1. BUCKET HEIGHT CONTROL LEVER. Automatically controls bucket height. Set control at desired height. When bucket reaches selected height, bucket control lever returns to neutral position.
2. TURN SIGNAL AND EMERGENCY FLASHER CONTROL. Pull lever down to operate left turn signal lights. Push lever upward to operate right turn signal lights. Pull short lever out while pulling long lever into slot and push lever up to operate emergency flasher lights.
3. TRANSMISSION CONTROL LEVER. Controls operation of transmission. Lever has four positions. Move lever forward to first detent to operate loader forward in low range. Move lever out towards operator and all the way forward to operate loader in high range. Move lever all the way to the rear to operate in reverse. Place lever in center for neutral.
4. STEERING WHEEL. Controls turning of loader.
5. PARKING BRAKE VALVE. Pull knob out to set parking brake. Brake is automatically set when air pressure drops below 63 psi.
6. ACCELERATOR. Controls engine speed. Depress pedal to increase speed. Release pedal to decrease speed.
7. BRAKE PEDAL. Depress pedal to apply vehicle wheel brakes and actuate stop light. Depressing pedal also actuates clutch cutout control and returns transmission to neutral. Clutch cutout operates only when transmission is in low range.

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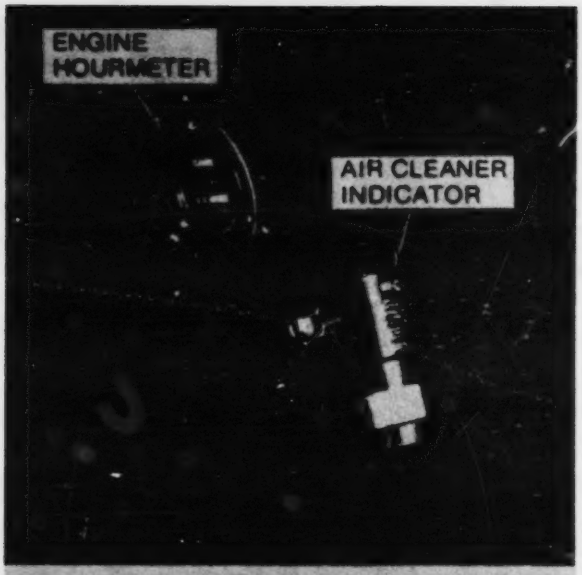
Figure 2-4. Operating controls.



ENGINE HOURMETER. Records elapsed running time of loader engine.
AIR CLEANER INDICATOR. When indicator red signal appears in full view, air cleaner must be serviced immediately. Green signal indicates air cleaner is in proper operating order. After servicing air cleaner, push reset button and release to set indicator.

Figure 2-5. Hood mounted instruments.

Section IV. OPERATION UNDER USUAL CONDITIONS

2-9. General

a. The instructions in this section are for the information and guidance of personnel who operate the loader.

b. The operator must know how to perform every operation the loader is able to execute. This section contains instructions on starting and stopping the loader, on operating the loader, and on coordinating the basic motions to perform the specific work tasks. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit each job.

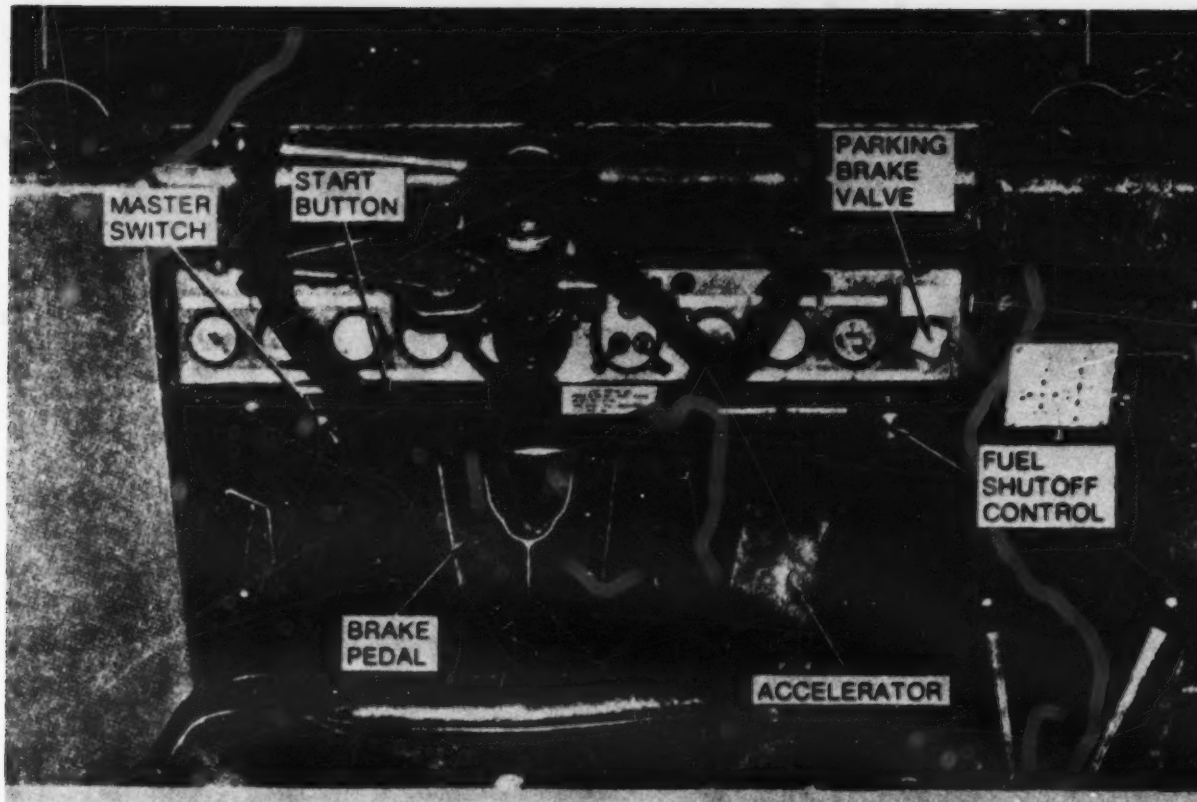
c. Adjust the seat (para 3-14) for comfortable operation and fasten seat belts securely before operating loader.

2-10. Starting.

Caution: **If starting loader is attempted using jumper cables, connect jumper cables to battery terminals only. Do not use vehicle frame for a ground.**

Before starting the loader refer to paragraph 3-5 and perform the required daily preventive maintenance services. Refer to figure 2-6 for starting instructions.

Caution: **Do not push or tow loader to start.**



STARTING

Note Before starting engine, place all control levers in neutral position.

Step 1. Push fuel shutoff control lever all the way in the instrument panel.

Step 2. Turn master switch to "on" position.

Step 3. Depress accelerator half way down.

Step 4. Depress start button.

Caution Do not operate starter continuously for longer than 30 seconds. After 30 seconds, allow starter to cool off for two minutes before attempting to start engine again.

Step 5. After engine starts, let engine idle until operating temperature is reached.

Step 6. Check all controls and instruments for proper

Step 7. Release parking brake by pushing valve knob all the way in before attempting to move the loader.

STOPPING

Step 1. Release accelerator and depress brake pedal to bring loader to safe smooth stop.

Step 2. Set parking brake by pulling valve knob all the way out.

Step 3. Place all control levers in neutral. Allow engine to open at 1/2 throttle for five minutes so that engine cools off gradually and prevents oil starvation of turbocharger.

Step 4. Pull fuel shutoff lever out to stop fuel flow.

Step 5. Turn master switch to "OFF" Position.

Figure 2-6. Engine starting and stopping procedures.

2-11. Stopping

a. Before shutting down the engine, steer the loader so that the front and rear sections are aligned.

***Warning:* To prevent possible injury or death to personnel, always lower bucket to ground before leaving loader unattended.**

b. Follow procedures in figure 2-6 and stop the loader.

c. Perform required daily preventive maintenance services as stated in paragraph 3-5.

2-12. Operation of Equipment

a. Placing Loader in Motion.

(1) Start the loader (para 2-10) and allow the engine to reach operating temperature.

(2) Raise the bucket about one foot from the ground. Refer to figure 2-7 for loader control lever operation.

(3) Release the parking brake and place the transmission control lever in the proper position for the desired direction and range.

(4) Depress the accelerator (fig. 2-4) to start the loader in motion. Regulate speed by altering pressure on the accelerator.

b. Shifting Transmission.

(1) To change direction (forward to reverse or reverse to forward) release the accelerator and stop the loader before moving the transmission control lever to avoid mechanical damage to power train components.

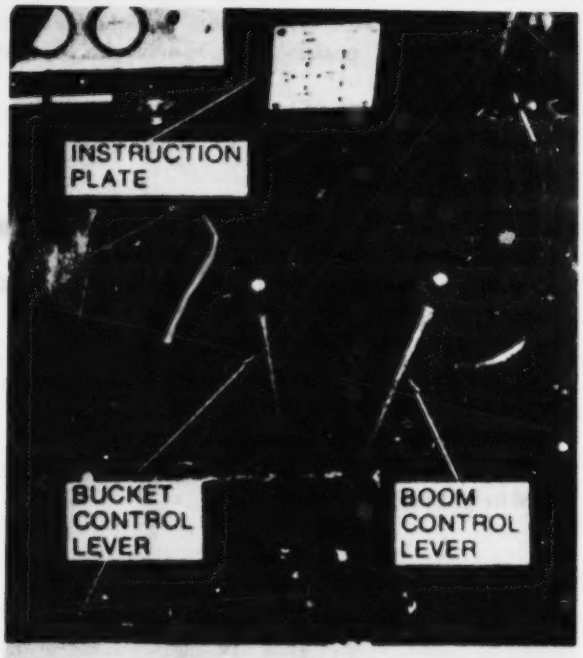
(2) Always operate the loader in a speed range that will require full speed operation of the engine.

c. Steering. Steer the loader by turning the steering wheel (fig. 2-4) in the direction of the turn desired. Hydraulic cylinders pivot the front end of the loader in the direction of turn. Hold the steering wheel in position until the turn is completed. To align the front and rear sections after completing a turn, rotate the steering wheel in the opposite direction until the sections are in line.

d. Bucket Height Control Lever Operation.

(1) The bucket height control lever (fig. 2-4) allows the operator to control bucket height automatically.

(2) The lever has three positions. The lowest position allows highest bucket travel, center position allows an intermediate height, and the highest lever position halts bucket at lowest position.



BOOM OR LIFT OPERATION

Step 1. To float bucket, move boom control lever to "FLOAT" position.

Step 2. To lower bucket, move boom control lever to "LOWER" position.

Step 3. To raise bucket, move boom control lever to "RAISE" position. Or lock in "RAISE" position and allow height control lever to control operation.

NOTE: With lever in "NEUTRAL" position, bucket will remain at height operation is halted.

BUCKET OPERATION

Step 1. To dump bucket, move bucket control lever to "DUMP BUCKET" position. Lever will return to neutral when released.

Step 2. To retract bucket, move bucket control lever to "RETRACT BUCKET" position. The bucket will automatically return to a level or dig position and the control lever will return to neutral.

Step 3. To open bucket clam, move bucket control lever to "OPEN CLAM" position.

Step 4. To close bucket clam, move bucket control lever to "CLOSE CLAM" position.

Figure 2-7. Loader control lever operation.

(3) Move loader to where bucket is to be dumped. With engine at idle speed, push height control lever (fig. 2-4) down to the bottom of its travel. Pull boom control lever (fig. 2-7) to "RAISE" position. When loader bucket reaches desired height, pull up on height control lever. When boom control lever returns to "HOLD" position, stop moving height control lever.

(4) Leave lever in this position. Bucket will raise to this height and stop.

e. Bucket Operation.

(1) *General.* The multi-purpose bucket consists of a mold board, a pivoted clam, and two hydraulic cylinders which operate the clam. Bucket operation is controlled by the bucket control lever and the boom control lever (fig. 2-7).

Caution: Never attempt to operate the bucket before the engine reaches operating temperature.

(2) *Normal loader operation (fig. 2-8).*

(a) Place the height control lever in the desired height position (*d* above).

(b) Move the bucket control lever to "CL CLAM."

(c) Raise the bucket by pulling the boom trol lever to "RAISE."

(d) Drive the loader to the material to be l ed.

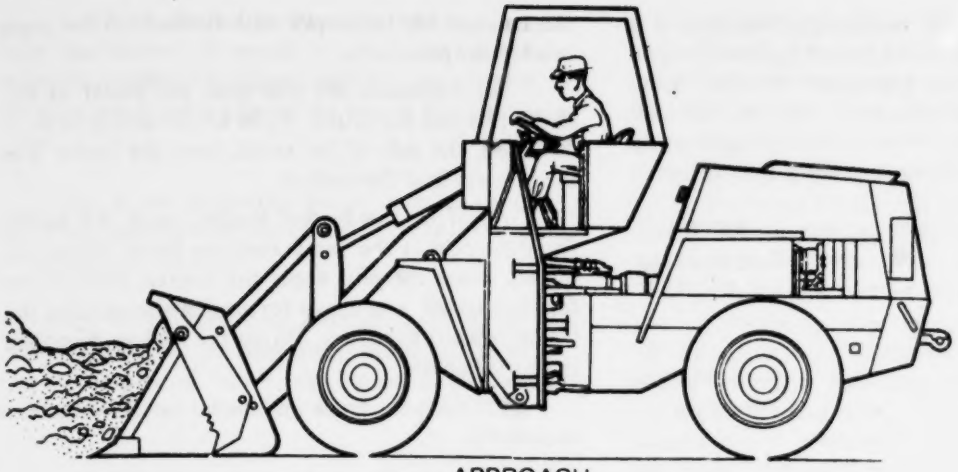
(e) Push the boom control lever to "LOW to lower the bucket, then place the lever in "N TRAL."

(f) Adjust the bucket angle for most effic loading.

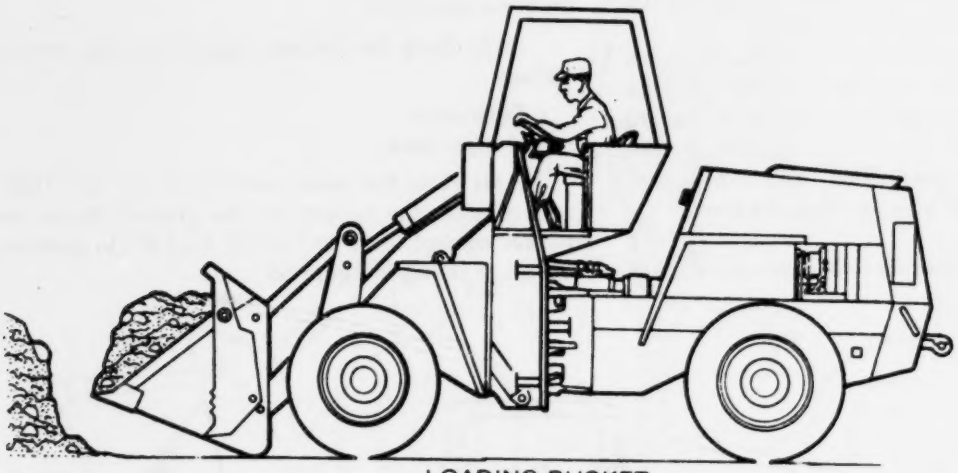
(g) With the transmission in low gear and accelerator fully depressed, drive the loader into material. Move the boom control lever tow "RAISE" as the bucket enters the material and bucket control lever toward "RETRACT BUCK as the bucket fills.

Note. If the loader begins to stall, touch the brake li and move the bucket control lever toward "RETRACT BUCKE

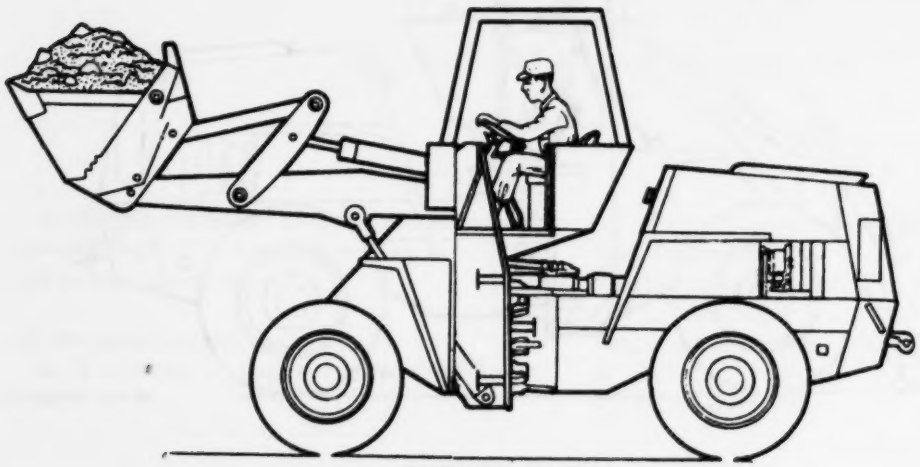
(h) Place the transmission in reverse, and b the loader from the material.



APPROACH



LOADING BUCKET



BUCKET LOADED

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Figure 2-8. Loading bucket.

(i) Drive the loader to the dumping area. If a truck is to be loaded, raise the bucket to clear the side of the truck. As the bucket moves over the truck body, move the bucket control lever toward "DUMP BUCKET" and pull the boom control lever toward "RAISE." Continue to move the loader forward until the bucket is empty.

(j) Pull the bucket control lever to "RETRACT BUCKET." Back loader away from the dumping area.

(k) Place the boom control lever in "FLOAT" to lower bucket.

(3) *Loading hard material.*

(a) Approach the material with the bucket positioned as described in subparagraph (2) above.

(b) As the bucket penetrates the material, place the boom control lever in "FLOAT." Move the bucket control lever back and forth between "DUMP BUCKET" and "RETRACT BUCKET" to agitate the bucket while moving the loader forward.

(c) As the bucket loosens the material, move the boom control lever toward "RAISE." As the bucket fills, move the bucket control lever toward "RETRACT BUCKET."

(d) When the bucket is filled, retract the bucket and transport the material to the dumping area.

(4) *Truck loading.*

(a) When truck loading from a stockpile, park the truck at 90° to the pile with the body of the truc toward the pile.

(b) Approach the pile with the loader at 45 to the pile and the truck. When the bucket is 10 to 1 feet from the side of the truck, turn the loader int the pile and load the bucket.

(c) With the bucket loaded, back the loade from the pile at the same angle as entry. When the bucket clears the pile, apply the brakes, shift to low forward speed, and move forward while turning the loader toward the truck. Dump the load as described in step (2) above.

(d) Keep the truck and loader as close together as possible.

(5) *Transporting load.*

(a) Carry the bucket close to the ground when transporting a load.

(b) Keep the bucket tipped back to prevent spillage.

f. Bulldozing.

(1) *Operation.*

(a) Move the boom control lever to "LOWER" and position the bucket on the ground. Move the bucket control lever to "OPEN CLAM" to position bucket as shown in figure 2-9.

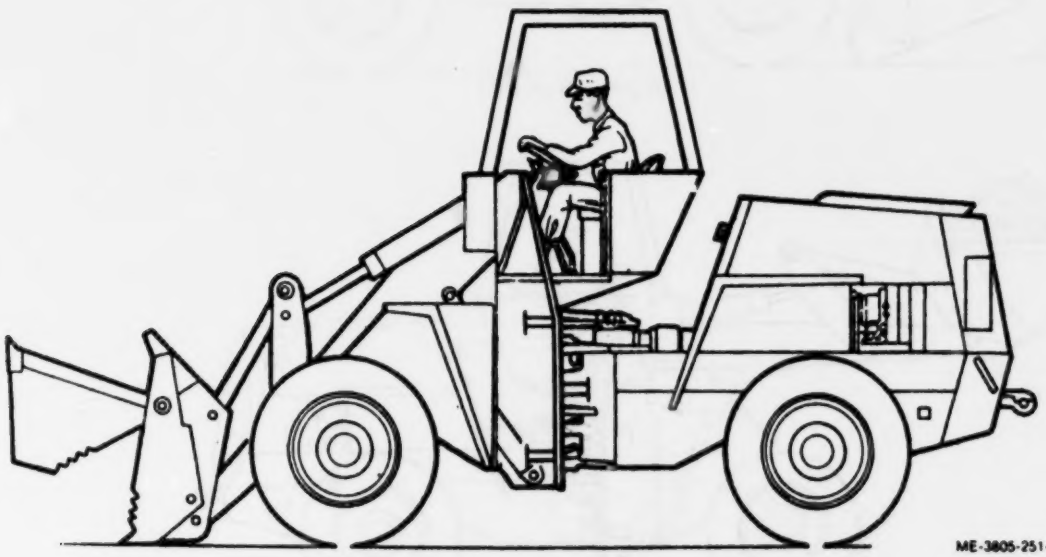


Figure 2-9. Clam positioned for bulldozing operation.

(b) Move the loader forward, pushing material with the bucket. A trench is usually formed from material spilled on either side of the bucket. If possible, work the loader in the trench for maximum loads.

(c) When removing brush and small trees, lower the cutting edge far enough into the ground to strike and cut the roots.

(d) When removing heavier trees, raise the bucket to a higher position for leverage and push the tree to the ground. Lower the bucket to the ground and cut the roots.

(2) *Bucket adjustment.*

(a) The digging angle of the bucket moldboard can be increased by tilting the bucket forward. Push the control lever toward "BUCKET DUMP" for deeper digging.

(b) The digging angle of the bucket moldboard can be decreased by moving the bracket control lever toward "RETRACT BUCKET."

g. Scraping.

(1) *Operation.*

(a) Move the boom control lever toward "LOWER" to position the bucket on the ground. Move the bucket control lever toward "OPEN CLAM" to position the bucket as shown in figure 2-10.

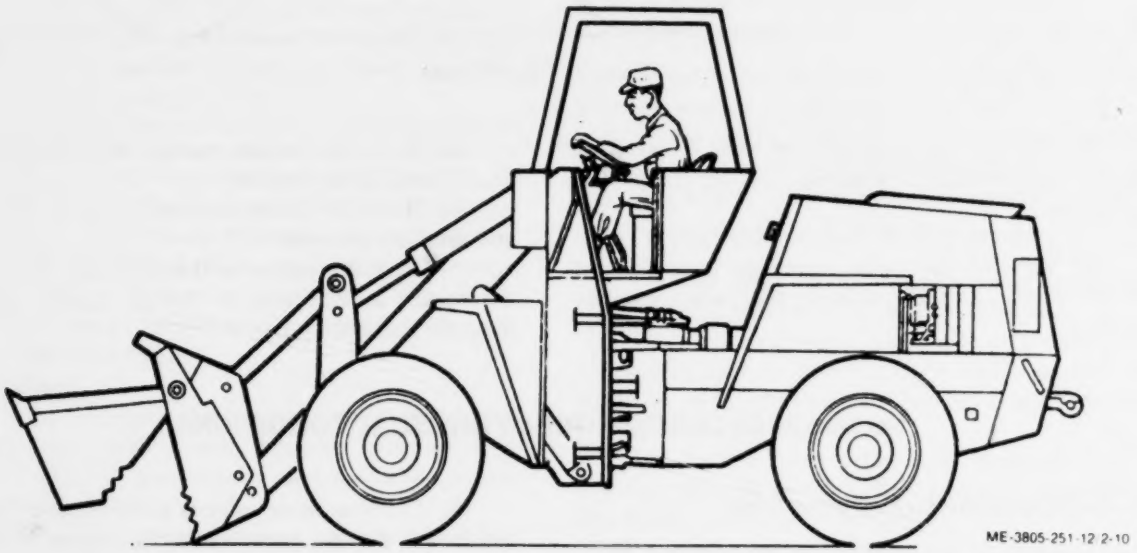


Figure 2-10. Clam positioned for scraping operation.

(b) Operate the loader as a scraper by placing the vehicle in motion. A two inch scraper cut will be obtained in the position shown.

(2) *Scraper adjustment.*

(a) If a deeper scraper cut is required, lower the bucket.

(b) If a shallower scraper cut is required, raise the bucket.

h. Clam Shell Operation.

(1) Move the boom control lever to raise the bucket off the ground. Move the bucket control lever to position the clam in the fully open position as shown in figure 2-11.

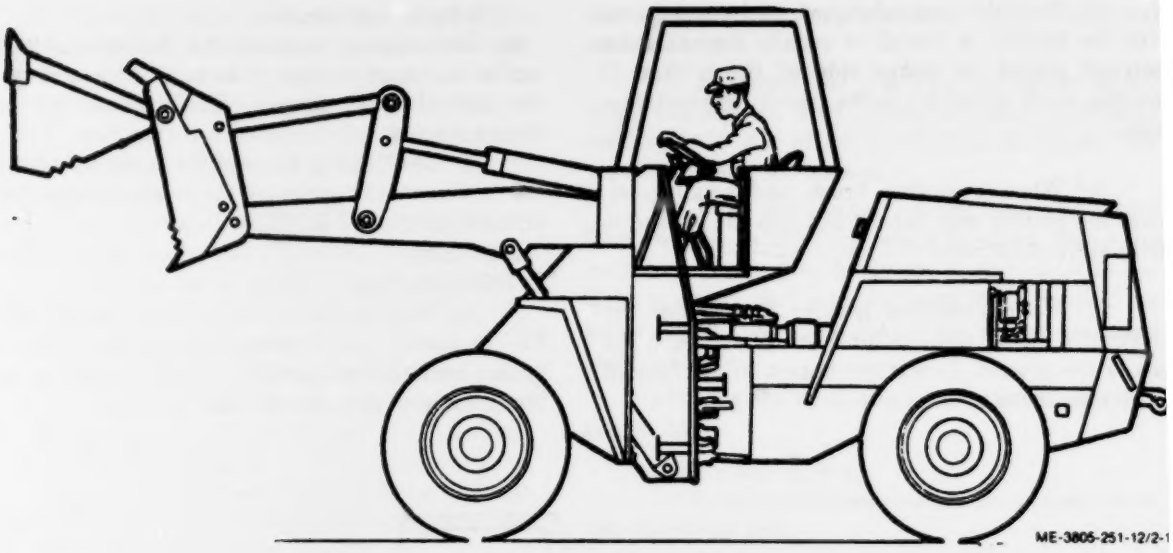


Figure 2-11. Clam fully open.

(2) Operate the boom control lever to raise the bucket high enough to suspend over the material to be loaded.

(3) With the clam open, move the boom control lever toward "LOWER" to lower the bucket into the material.

(4) Move the bucket control lever to "CLOS CLAM" and fill the bucket.

(5) Move the boom control lever to "RAISE and clear the material.

(6) Move the loader to the dumping area. Mov the bucket control lever to "OPEN CLAM" and r lease the material.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-13. Operation in Extreme Cold

a. General. If the loader is to be operated in extreme cold weather temperatures, certain precautions must be taken to ensure continued normal operation.

b. Cooling System. Check the cooling system for the correct antifreeze solution for the temperature (para 2-1). Inspect the cooling system for leaks.

c. Batteries. Keep the batteries fully charged to prevent freezing. When water is added to the batteries, run the engine at least one hour to mix the electrolyte solution.

d. Fuel System. Fill the fuel tank after operation. Drain condensation from the tank before and after operation. Drain and service the fuel filter often.

e. Lubrication. Thoroughly lubricate the loader according to the current Lubrication Order.

f. Operation.

(1) Start the engine and allow it to reach normal operating temperature before applying load.

(2) If mud or snow collects and freezes on any the loader moving parts while the engine is idlin thaw the frozen parts before attempting to operat the loader.

(3) Operate the hydraulic units with care unt they have warmed up.

(4) Check all operations to ensure the loader i operating normally.

g. Parking.

(1) Park the loader on high ground if possibl Prepare a footing of planks or brush if necessary t keep the wheels from freezing to the ground. Bloc the wheels and release the parking brake. Plac blocks under the bucket to prevent it from freezing t the ground.

(2) Clean all mud, snow, and ice from the bucke Place the loader under cover if possible.

2-14. Operation in Extreme Heat

a. General. Continuous operation of the loader i high temperatures may cause the loader to overhea

Avoid continuous low gear operation if possible. Observe engine and transmission temperatures and allow the loader to cool off whenever necessary.

b. Cooling System.

(1) Inspect and service the fan and radiator frequently. Keep the coolant level one inch from the top of the radiator. Check the radiator fins for an accumulation of dust, sand, and insects which could block the cooling passages.

(2) Change coolant each year to keep the corrosion inhibitor at full strength.

(3) If necessary, flush the cooling system periodically to keep passages clear. Do not use water with a high alkali content.

c. Batteries. Check the level of electrolyte daily. Keep the electrolyte above the plates to prevent damage to the batteries. Use a slightly weaker electrolyte in hot climates. Dilute 1.280 specific gravity electrolyte as issued to 1.200 to 1.240 specific gravity reading at full charge. Recharge batteries when the specific gravity drops to 1.160.

Note. Batteries discharge at a higher rate if left standing for long periods at high temperatures. If the loader is to stand for several days, remove the batteries and store in a cool place.

d. Fuel System. Service the fuel system. Check fuel for water content before filling the tank. Condensation could be formed in the fuel tank or storage drums.

e. Lubrication. Lubricate as instructed in the current Lubrication Order.

f. Parking.

(1) Do not park the loader in the sun for long periods. Park under cover whenever possible. Protect the engine, transmission and hydraulic pumps from sand and dirt.

(2) In hot, damp climates, protect unfinished exposed metal surfaces with a film of preservative lubricating oil, medium. Protect cables and terminals with ignition-insulation component. Apply paint or rust preventive to damaged surfaces to protect from rust and corrosion.

2-15. Operation in Dusty or Sandy Areas

a. General. Operation of the loader may cause dust in almost any area. However, when operating in predominately dusty or sandy areas, additional precautions must be taken.

b. Cooling System. Keep radiator fins and passages clean. Blow out with compressed air as often as necessary.

c. Fuel System. Prevent dust and sand from entering the fuel tank or filters when servicing the fuel system.

d. Air System. Service the air cleaner frequently, check the air restriction indicator daily, and keep the dust valve clean. Prevent dust and sand from entering the engine parts as much as possible.

e. Lubrication. Lubricate the loader according to the current Lubrication Order. Lubricate and service more frequently than normal. Clean fittings before lubricating.

f. Parking. Protect loader from dust and sand by parking under cover, if possible.

2-16. Operation under Rainy or Humid Conditions

a. General. Operation under rainy or humid conditions is similar to operation in extreme heat.

b. Preservation. Keep all exposed surfaces coated with a medium preservative lubricating oil. Cover all paint cracks and marks to prevent corrosion.

2-17. Operation in Salt Water Areas

a. General. Salt water and salt water spray can cause extensive corrosive damage to the loader.

b. Preservation. When exposed to salt water, dry thoroughly and rinse with fresh water as soon as possible. Coat exposed surfaces with medium preservative lubricating oil.

c. Lubrication. Lubricate loader as prescribed in the current Lubrication Order. Lubricate areas subject to salt water more frequently.

2-18. Operation at High Altitudes

a. General. The power output of an internal combustion engine is reduced at high altitudes. Satisfactory performance can be maintained by following all operating and maintenance instructions.

b. Cooling System. Check for overheating. Check the radiator cap for a good seal.

c. Air Cleaner. Clean and service the air cleaner daily to insure maximum intake of air for engine operation.

Section VI. OPERATION OF MATERIAL USED IN CONJUNCTION WITH THE EQUIPMENT

2-19. Fire Extinguisher

a. General. The dry chemical type fire extinguisher is mounted on a bracket in the operator's compartment.

b. Operation. Remove the fire extinguisher from its bracket, lift the handle, press the lever, and direct the powder at the base of the flame using a side-to-side sweeping motion.

c. Maintenance. Weigh the fire extinguisher every six months and replace if weight is less than 4½ pounds or if pressure is below 125 pounds.

2-20. Cold Start Kit

a. General. The cold start kit consists of a cylinder filled with ether, a valve, a tube and an aspirator in the intake manifold. Pushing the switch mounted on the instrument panel opens the valve and permits ether to flow to the manifold, where it is drawn into the engine cylinders.

***Caution:* When the loader is to be used in a warm climate, remove the ether cylinder. This will prevent inadvertent injection of the fluid and possible damage to the engine.**

b. Operation.

(1) Depress the switch (fig. 2-2) and wait seconds.

(2) Engage the starter. If engine fails to repeat procedure.

(3) Use the starting kit only in temper below 15°F.

c. Servicing. Refer to paragraph 4-20 for cold kit servicing.

2-21. Tire Inflation Kit

A tire inflation kit (fig. 2-12) utilizes air fron main air reservoir to fill tires in the field. Th consists of a hose which fits on a quick discon fitting (fig. 2-12) on right of loader, an air chuck, a pressure gage.

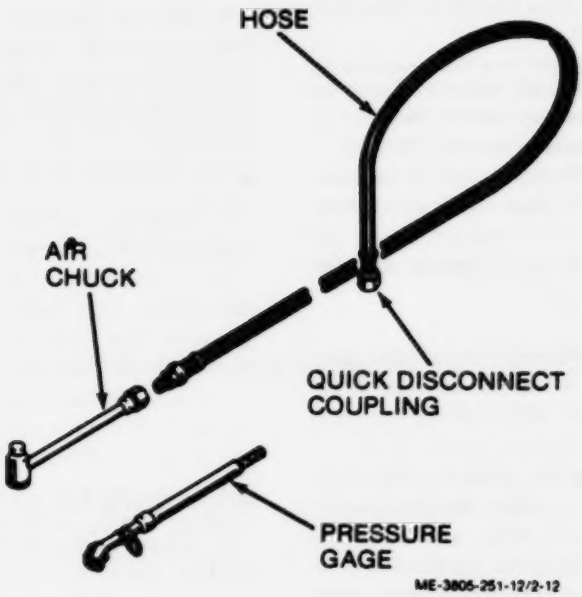


Figure 2-12. Tire inflation kit operation.

CHAPTER 3
OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. BASIC ISSUE ITEMS

3-1. Tools and Equipment

Tools and equipment issued or authorized for use with the loader are listed in the Basic Issue Items List, Appendix C of this manual.

Section II. LUBRICATION INSTRUCTIONS

3.2. General

This section contains lubrication instructions to supplement the Lubrication Order. Refer to LO 5-3805-251-12.

3-3. Detailed Instructions

a. General. Keep all lubricants in closed containers and store in a cool, dry place. Prevent foreign material from contaminating the lubricant.

b. Cleaning. Keep lubrication points clean and keep lubricants off items which do not require lubrication.

c. Points of Lubrication. Service the points of lubrication at required intervals. Refer to the LO 5-3805-251-12.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-4. General

Preventive maintenance is detecting/correcting problems before they happen, or fixing little problems before they become big problems. Table 3-1 contains a list of preventive maintenance checks and services to be performed by operator/crew. Attention to these checks and services will increase the useful life of the scoop loader, but every possible problem cannot be covered in the PMCS. You need to be alert for anything that might cause a problem.

3-4.1. Maintenance Forms and Records

Every mission begins and ends with the paperwork. There isn't much of it, but you have to keep it up. The forms and records you fill out have several uses. They are a permanent record of the services, repairs, and modifications made on your equipment. They are reports to organizational maintenance and to your commander. And they are a checklist for you when you want to know what is wrong with the equipment after its last use, and whether those faults have been fixed. For the information you need on forms and records, see DA Pam 738-750.

3-5. Preventive Maintenance Checks and Services

a. Do your (B) PREVENTIVE MAINTENANCE just before you operate the equipment. Pay attention to the CAUTIONS and WARNINGS.

b. Do your (D) PREVENTIVE MAINTENANCE during operation. (During operation means to monitor the scoop loader and its related components while they are actually being operated).

c. Do your (A) PREVENTIVE MAINTENANCE right after operating the equipment. Pay attention to the CAUTIONS and WARNINGS.

d. Do your (W) WEEKLY PREVENTIVE MAINTENANCE weekly.

e. Do your (M) MONTHLY PREVENTIVE MAINTENANCE once a month.

f. If something doesn't work, troubleshoot it with the instructions in this manual or notify your supervisor.

g. Always do your PREVENTIVE MAINTENANCE in the same order, so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.

h. If anything looks wrong and you can't fix it, write it on your DA Form 2404. If you find something seriously wrong, report it to organizational maintenance RIGHT NOW.

i. When you do your PREVENTIVE MAINTENANCE take along the tools you need to make all the checks. You always need a rag or two.

WARNING

Drycleaning solvent, used to clean parts, is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138° F.

(1) *Keep it clean.* Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use drycleaning solvent (SD-2) to clean metal surfaces. Use soap and water when you clean rubber or plastic material.

(2) *Bolts, nuts, and screws.* Check them all for obvious looseness, missing, bent, or broken condi-

tion. You can't try them all with a tool, of course. But look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it or report it to organizational maintenance.

(3) *Welds.* Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to organizational maintenance.

(4) *Electrical wires and connectors.* Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure the wires are in good shape.

(5) *Hoses and fluid lines.* Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to organizational maintenance.

j. It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn, then be familiar with them and REMEMBER WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR!

Leakage definitions for Operator/Crew PMCS.

Class I Seepage of fluid (as indicated wetness or discoloration) n great enough to form drops.

Class II Leakage of fluid great enough to fo drops but not great enough cause drops to drip from ite being checked/inspected.

Class III Leakage of fluid great enough to for drops that drip from the ite being checked/inspected.

WARNING

Equipment operation is not permitted when any form of fuel leakage is detected (class I, II, or III leaks).

CAUTION

Equipment operation is allowable with minor leakage (Class I or II). Of course, consideration must be given to the fluid capacity in the item/system being inspected/checked. When in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS. Class III leaks should be reported to your supervisor or to organizational maintenance.

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

B-Before D-During A-After W-Weekly M-Monthly

Item no.	Interval B	D	A	W	M	ITEM TO BE INSPECTED Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
						NOTE PERFORM WEEKLY AS WELL AS BEFORE PMC'S IF: *a.* You are the assigned operator but have not operated vehicle since the last weekly. *b.* You are operating the vehicle for the first time.	
1						MAKE THE FOLLOWING WALK AROUND CHECKS: (Exterior of vehicle)	
	●					*a.* Check for evidence of leakage (oil, fuel, hydraulic fluid, or coolant) on or under the scoop loader.	Class III leakage is evident (fuel leakage is allowed).
	z					*b.* Check roll over protection structure (ROPS) for damage or loose mounting.	ROPS missing, cracked weld buckled or split seams and lo or missing mounting bolts.
	●					*c.* Check the tire for damage or low pressure (correct pressure is 35 psi).	Tires have cuts or abrasions which would result in tire failure during operation. One or more tires missing or unserviceable.
	●					*d.* Check lift, tilt, and clam cylinder for leaks (at packing gland or fittings) or damage (nicks or scoring).	Class III leakage is evident.
	●					*e.* If equipped, check that fire extinguisher is in proper place and has proper pressure (125 psi).	
2	●					*f.* Visually check for loose, missing, or damaged parts.	
						RADIATOR Check coolant level. Fill to the overflow.	

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services – Continued

Item no.	Interval B	D	A	W	M	ITEM TO BE INSPECTED Procedure: Check for and have repaired, filled, or adjusted as needed	Equipment is not ready/ available if:
3	●					BELTS Inspect fan, alternator, generator, and air compressor belts for frayed condition or deterioration.	Belt missing or broken
4				●		ALCOHOL EVAPORATOR Check and refill as required (freezing temperature).	
5	●					AIR CLEANER *a.* Empty dust cup.	
		●				*b.* Check indicator during operation. Service when indicator is in red.	
6				●		FUEL FILTERS Drain enough fuel from strainer and filter to insure removal of water and foreign particles (drain in suitable container for convenient disposal).	
7			●			AIR RESERVOIR Open drain cock momentarily to release accumulated moisture.	
8				●		BATTERIES **WARNING** Do not smoke or allow open flame in vicinity while checking or filling battery. The battery generates hydrogen, a highly explosive gas. Check level of electrolyte. If low, fill with clean water (distilled if possible) to the split ring. In freezing weather, run engine at least 15 minutes after adding water.	
9		●				LIGHTS Check lights for proper operation.	
10						INSTRUMENTS Check for normal operating readings for the instruments as follows:	Gages not within ranges specified
		●				*a.* VOLTMETER ..... 22 to 28-1/2 volts	
		●				*b.* OIL PRESSURE gage ..... 45 to 55 psi	
		●				*c.* ENGINE TEMPERATURE gage ..... 179° to 210° F	
		●				*d.* HYDRAULIC OIL PUMP INLET gage ..... 12 to 14 psi (Idling pressure) ..... 13 to 19 psi	
		●				*e.* CONVERTER TEMPERATURE gage Green zone (250° to 360° F.)	
		●				*f.* CLUTCH PRESSURE gage ..... 145 to 180 psi	
		●				*g.* AIR PRESSURE gage ..... 105 to 125 psi	
11		●				CONTROL LEVERS AND PEDALS Check for proper operation.	Controls are not operable.
12		●				SERVICE BRAKES Check for proper operation.	Improper operation is evident.

Section IV. TROUBLESHOOTING

3-6. General

Table 3-2 provides information for diagnosing and correcting improper operation or failure of the loader components. Each symptom is followed by a list of probable causes and possible remedies. Refer any trouble beyond the scope of operator maintenance to organizational maintenance personnel.

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Engine cranks but fails to start or is hard to start.	a. Insufficient fuel.	a. Check and fill fuel tank (para 3-9).
	b. Water in fuel.	b. Drain fuel filters (para 3-10).
	c. Clogged fuel filter.	c. Service fuel filters (para 3-10).
	d. Insufficient air to engine.	d. Service air cleaner (para 3-8).
2. Engine stops suddenly.	a. Fuel tank empty.	a. Check and fill fuel tank (para 3-9).
	b. Clogged fuel filter.	b. Service fuel filter (para 3-10).
	c. Insufficient air to engine.	c. Service air cleaner (para 3-8).
3. Engine overheats.	a. Low coolant level.	a. Check coolant level and fill radiator (para 3-11).
	b. Low oil level.	b. Check engine oil level and fill crankcase (para 3-7).
4. Engine power low.	a. Clogged fuel filter.	a. Service fuel filters (para 3-10).
	b. Insufficient air to engine.	b. Service air cleaner (para 3-8).
5. Engine smokes excessively.	Insufficient air to engine.	Service air cleaner (para 3-8).
6. Engine oil pressure low.	a. Low crankcase oil level.	a. Check oil level and add oil as necessary (para 3-7).
	b. Oil leak.	b. Check oil lines (para 3-7).
7. Exhaust system leaking.	a. Restricted exhaust pipe.	a. Inspect and clean (para 4-22).
	b. Loose clamps	b. Tighten clamps (para 4-22).
8. Hydraulic system does not operate properly.	a. Reservoir oil level low.	a. Check oil level and add oil as necessary (para 3-12).
	b. Air valve closed.	b. Open valve to pressurize tank (para 3-12)
9. Wheel brakes do not operate properly.	a. Leak in air system.	a. Check and correct (para 4-47).
10. Steering does not operate properly.	b. Insufficient hydraulic fluid in actuator. Leak in hydraulic lines.	b. Check and replenish fluid (para 4-47). Check and correct (para 3-12).

Section V. MAINTENANCE OF THE MW24B LOADER

3-7. Engine Service

a. Inspection.

(1) Inspect attaching bolts, nuts, screws and clamps for tightness.

(2) Inspect lubrication and cooling line connections for signs of leakage.

(3) Inspect hoses and belts for deterioration.

(4) Inspect housings for chips or cracks.

(5) Inspect engine components for dents, bends or other damage.

b. Service.

(1) Check the crankcase oil level daily. The turbocharger depends on engine oil as a coolant and for lubrication.

(a) Check the oil level with the dipstick and add oil as necessary to bring the oil level to the "FULL" mark on the dipstick (fig. 3-1.)

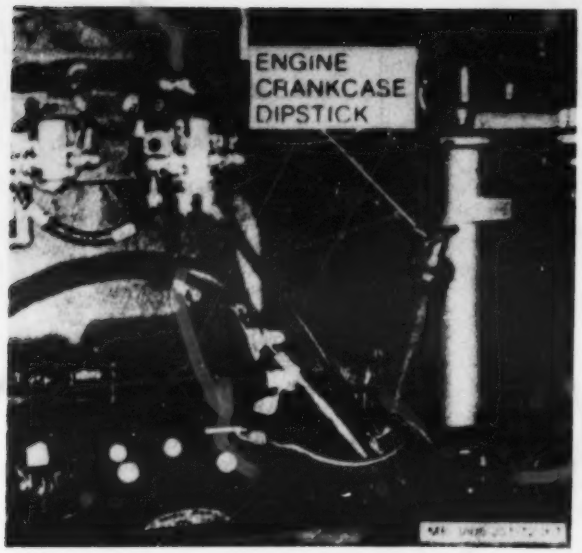


Figure 3-1. Crankcase oil level dipstick

(b) Wait 2 or 3 minutes to let the oil drain into the crankcase and again check the oil level.

(2) Change the crankcase oil every 100 hours as follows:

(a) With the engine at operating temperatu remove the magnetic drain plug from the oil p and allow the oil to drain.

(b) Clean the drain plug and install with a ne gasket. Tighten securely.

(c) Fill the crankcase with 17 quarts of engi oil if the oil filter was not changed or with 19 quar of engine oil if the oil filter was changed.

(d) Pull out the fuel shutoff control and cran the starter for 30 seconds to lubricate the turb charger.

(e) Start the engine and check for leaks.

(3) Replace engine oil filter every 200 hour (para 4-13).

3-8. Air Cleaner Service

a. Whenever the red signal appears in the air clea er service indicator (fig. 2-5), the air cleaner mu be serviced.

b. Loosen the clamp (1, fig. 3-2) and remove th cup (2) and gasket (3).

c. Loosen wing nut (4), and remove the baffle (5 and gasket (6). Slide out the filter element (7) fro the body (10). Remove inner element (8).

d. Remove the unloader (9) from the cup.

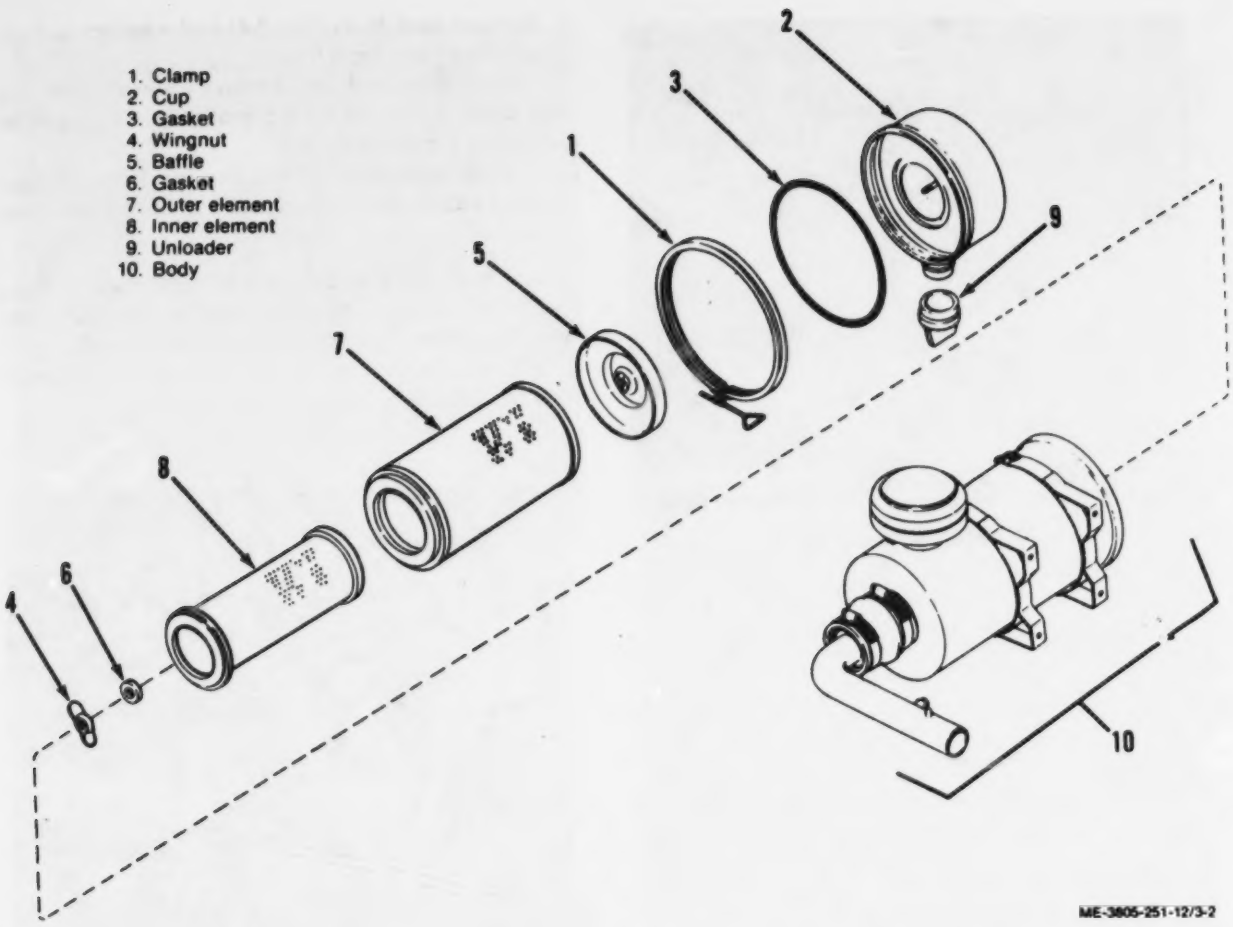


Figure 3-2. Air cleaner, exploded view

e. Clean the exterior and interior of the air cleaner body (10).

***Caution:* When using air pressure for cleaning or drying purposes use only low pressure (30 psi or less) air.**

f. Blow dust and dirt from the element with compressed air. Blow from the inside out.

Note. The filter element may be cleaned and reused as many as six times before it must be replaced. Tag the element to record the number of times it has been cleaned.

g. Install filter element and reassemble the air cleaner.

h. Push in the reset button on the air cleaner indicator and release.

3-9. Fuel Tank Service

a. Adding Fuel. Remove engine left side panel. Check the level of fuel in the fuel tank by withdrawing the dipstick (fig. 3-3). Add fuel as necessary to bring the level up to the "FULL" mark. Always clean the filler neck area before removing the filler cap. Fill the tank at the end of each work day to help prevent moisture from collecting in the fuel system. Fuel tank capacity is 74 gallons.

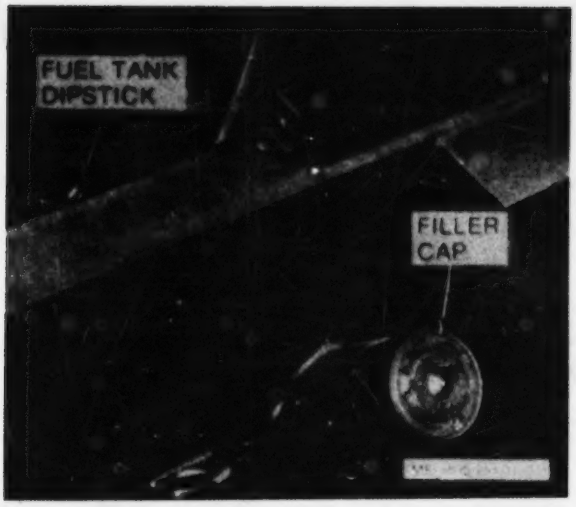


Figure 3-3. Fuel tank service

b. Draining. Open drain cock on bottom front of tank and allow the fuel to drain.

3-10. Fuel Filter Service

a. Remove the engine right side panel.

b. Close fuel tank shut off valve and remove drain plugs (fig. 3-4) from filter.

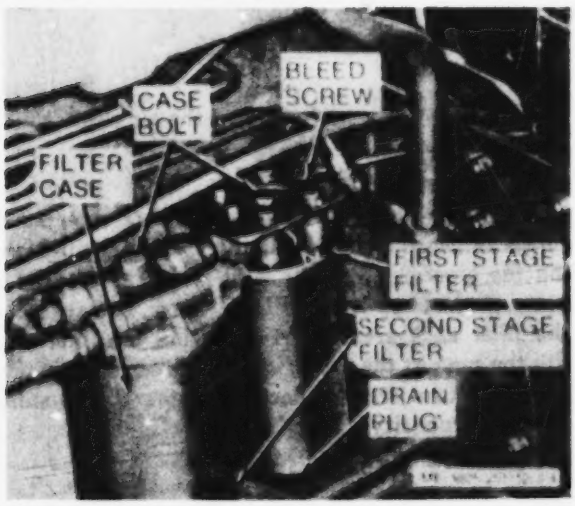


Figure 3-4. Fuel filter service

c. Remove case bolts (fig. 3-4) and washers and remove filter cases from filters.

(1) First stage filter. Remove element from case and wash in solvent. Dry thoroughly. Clean case in solvent and install element.

(2) Second stage filter. Remove filter element and discard element. Clean case and install new filter element.

d. Install filter cases, with new gaskets, on filter heads and secure with case bolts (fig. 3-4) and washers. Install drain plugs in bottom of filter cases.

e. Loosen bowl nut (fig. 3-5) and remove sediment bowl and strainer from fuel transfer pump.

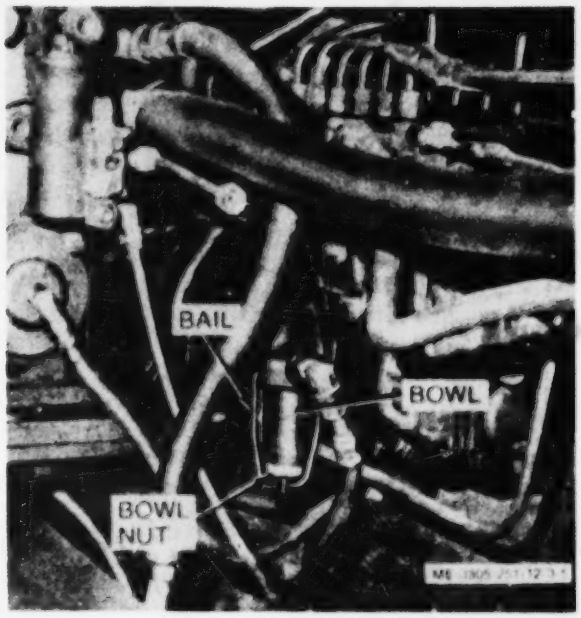


Figure 3-5. Fuel transfer pump fuel filter

f. Wash strainer and sediment bowl in solvent and dry thoroughly. Replace strainer or bowl if damaged.

g. Install strainer and bowl on fuel transfer pump and secure by tightening bowl nut.

h. Open fuel tank shut off valve.

i. Remove bleed screw (fig. 3-4) on first stage filter. Turn master switch to "ON" position to force fuel from electric pump (fig. 3-6) to transfer pump. The transfer pump sends fuel to the filters. When fuel, clear and bubble free appears at bleed screw hole, install bleed screw.

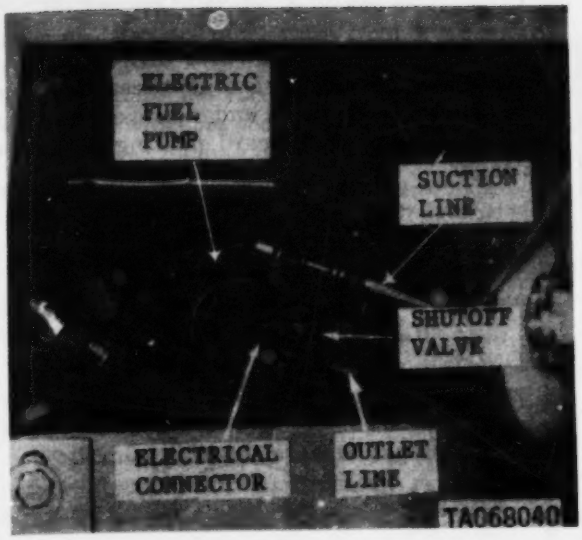


Figure 3-6. Electric fuel pump

j. Install engine side panel.

3-11. Cooling System Service

a. Check Coolant Level. Remove radiator cap (fig. 3-7). Add coolant if necessary.

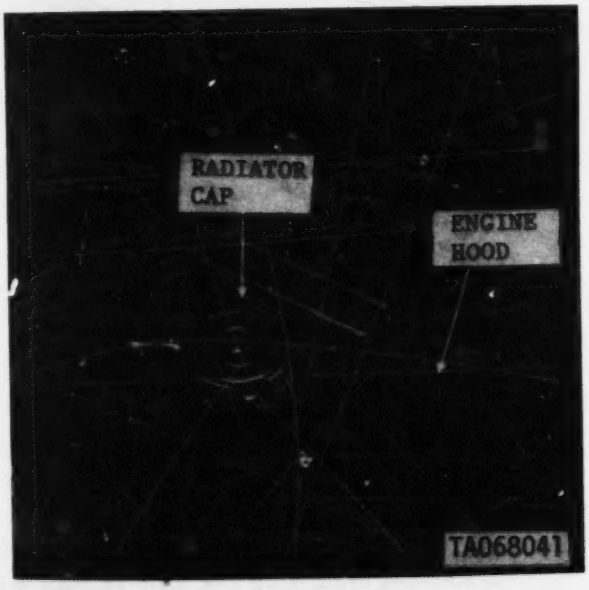


Figure 3-7. Radiator cap

b. Drain Cooling System.

(1) To drain cooling system, remove radiator cap (fig. 3-7).

(2) Remove engine side panels and open drain cock (fig. 3-8) at lower left corner or radiator and allow radiator to drain.

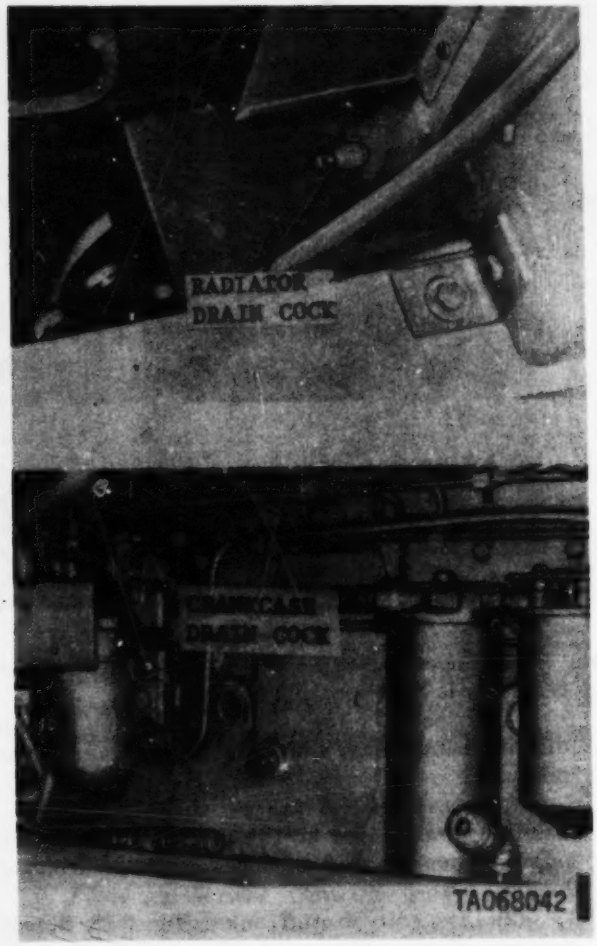


Figure 3-8.Cooling system drains.

(3) Open drain cock (fig. 3-8) on right side of engine and drain engine block. Drain oil cooler (fig. 4-1). Drain air compressor.

c. Filling Cooling System.

(1) Close drain cock (figs. 3-8 and 4-1). Close air compressor drain cock.

(2) Fill radiator to proper level.

(3) Start engine (fig. 2-6) and allow to run until operating temperature is reached. Stop engine if necessary.

(4) Check coolant level (*a* above) and add coolant if necessary.

3-12. Hydraulic Oil Reservoir

a. Inspection.

(1) Remove front access panel.

(2) Inspect the reservoir (fig. 3-9) and connecting lines for leaks.

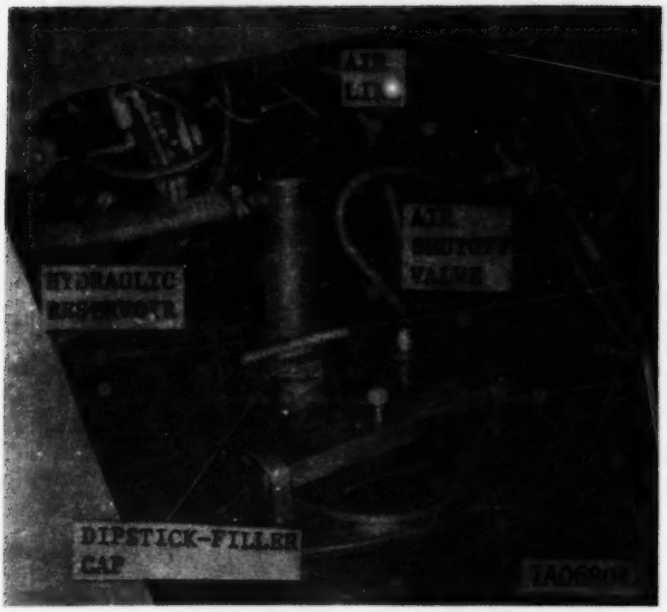


Figure 3-9. Hydraulic oil reservoir

(3) Check hounting bolts to ensure that the reservoir is held securely in position.

(4) Inspect the reservoir for corrosion and for dirt, mud and grease which would contaminate the oil.

b. Checking Fluid Level.

(1) Lower bucket to the ground and shut off engine. Open or remove access plate at front of loader.

(2) Close air shutoff valve (fig. 3-9). Slowly remove dipstick-filler cap (fig. 3-9) to let air pressure escape. Remove dipstick and check oil level. Oil level should be between FULL and ADD mark on dipstick. Add oil if necessary.

(3) Install dipstick and preformed packing. Open air shutoff valve and start engine. Operate loader functions through several cycles to remove air from system.

c. Breather Service.

(1) Lower bucket to ground and shut off engine.

(2) Close air shutoff valve (fig. 3-9) and slowly open dipstick-filler cap to relieve air pressure.

(3) Remove breather (fig. 3-9) from tee. Clean breather in solvent and dry thoroughly. Replace breather if damaged.

(4) Install breather in tee. Tighten dipstick-filler cap. Start engine and operate loader.

CAUTION

Do not operate engine above low idle speed until pump inlet pressure gage indicates 5 to 15 psi.

d. Filter Service.

(1) Lower bucket to ground and shut off engine.

(2) Close air shutoff valve (fig. 3-9). Loos screw (fig. 3-10) slowly. Let air pressure esca Remove bar (fig. 3-10) and remove cover a preformed packing. Discard packing if worn damaged.

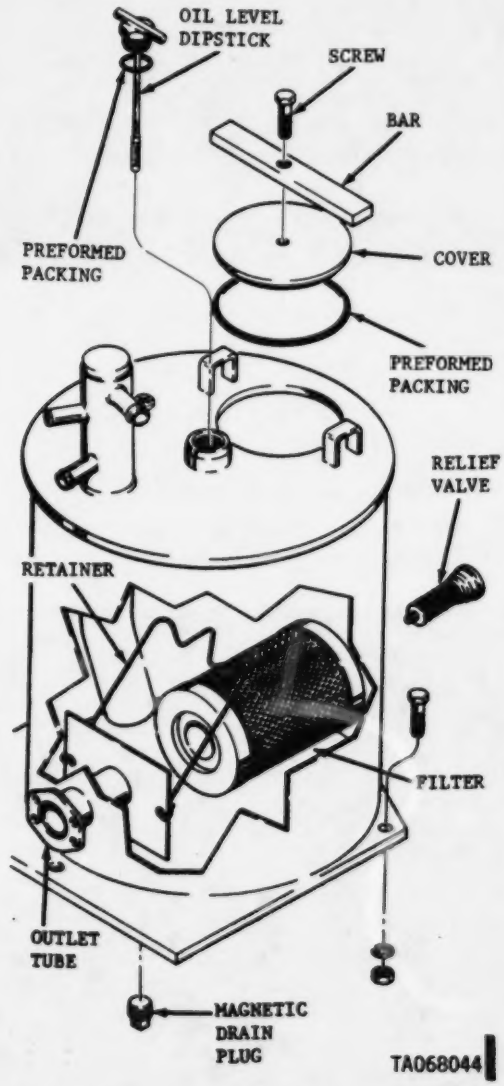


Figure 3-10. Hydraulic reservoir and filter, exploded view.

(3) Remove drain plug (fig. 3-10) at bottom reservoir and drain oil into a suitable container.

(4) Reach through cover opening and lift th retainer (fig. 3-10) at bottom of reservoir to fre filter.

(5) Clean inside of reservoir with a clea lint-free cloth. If possible, run a magnet acros bottom of reservoir to pick up any steel chips an foreign matter.

(6) Remove filter (fig. 3-10) and relief valve from reservoir. Remove relief valve from filter and discard filter.

(7) Install relief valve in new filter. Install filter in reservoir with open end of filter over outlet tube.

(8) Lower retainer over filter to secure filter in place.

(9) Install drain plug (fig. 3-10) in bottom of reservoir. Fill reservoir with proper grade of oil.

(10) Install cover (fig. 3-10) and preformed packing. Secure cover with bar and screw. Tighten dipstick-filler cap. Open air shutoff valve (fig. 3-10).

(11) Operate loader and pressurize system. Check operation of hydraulic system on loader. Check for air and oil leaks at reservoir.

Caution: **Do not operate engine above low idle speed until pump inlet pressure gage indicates 5 to 15 psi.**

(12) Close front access door to install cover plate.

3-13. Alcohol Evaporator Service

In freezing temperatures, check the level of alcohol in the evaporator (fig. 3-11) each day and replenish if necessary. To check the level or fill, remove the engine right side panel and remove the plug from the top of the evaporator.

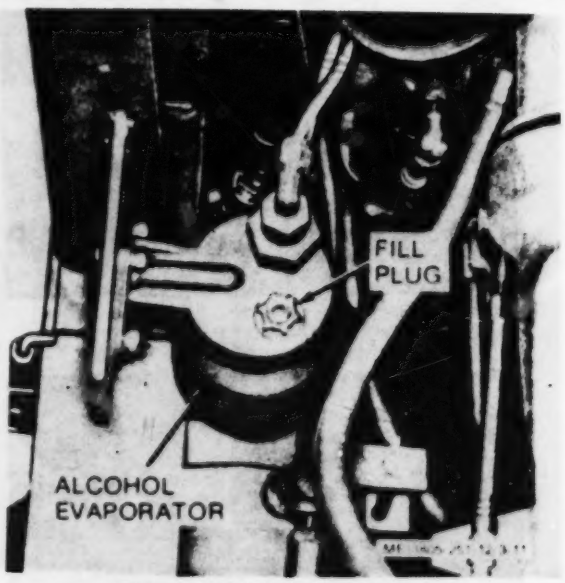


Figure 3-11. Alcohol evaporator service

3-14. Seat Adjustment

a. To adjust the seat vertically, remove two wing nuts (fig. 3-12) and bolts. Move seat to proper position. Install bolts and secure with wing nuts. The seat is adjustable within four inches in the vertical direction.

b. To adjust the seat horizontally depress the seat adjustment lever (fig. 3-12) and move the seat forward or backward, as required.

c. Release tilt lever and tilt seat forward when loader is not in operation to protect seat cushions and back from weather. Seat can also be tilted to more comfortable positions during operation.

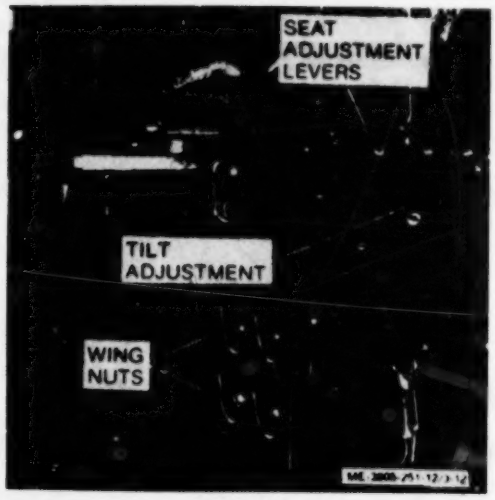


Figure 3-12. Seat adjustment

3-15. Tire Service

a. Inspection. Periodically inspect tires for cuts, smooth spots, and uneven wear.

b. Service. Check tire air pressure and maintain pressure at 45 psi (cold).

3-16. Axle and Planetary Service

a. Inspection. Inspect the differentials and planetaries for evidence on cracks, leaks and damage.

b. Planetary Service. Move the loader until the arrow on the planetary cover (fig. 3-13) points to the ground. Remove the oil level check plug (fig. 3-13). Oil should run out the opening. If the level is low, add oil as necessary. Refer to the Lubrication Order for the correct lubricant. Planetary capacity is 2 quarts.

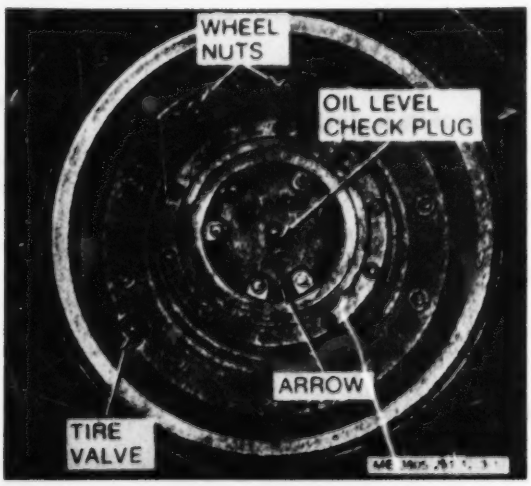


Figure 3-13. Axle planetary gear service

c. Differential Service. Remove the differential filler plug (fig. 3-14). Oil should run out of opening. If level is low, add oil as necessary. Refer to the Lubrication Order for the correct lubricant. Differential capacity is 13 quarts.

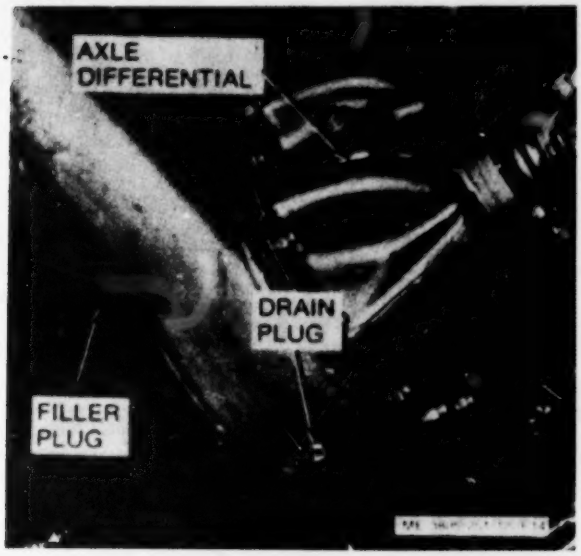


Figure 3-14. Axle differential service

d. Axle Breather.

(1) *General.* The axle breathers are connected to the axles by hoses. The rear breather is attached to the right side engine hood support. Front axle breather hose extends up into the hydraulic oil reservoir compartment.

(2) *Replacement.* Remove hose clamp and remove breather and adapter from hose. To replace hose, remove screws, nuts and lock washers and clamp securing hose to frame. Remove hose clamp and disconnect hose from axle. Clean breather in solvent and dry thoroughly. Inspect breather and replace if damaged. Install breather, adapter, and hose in reverse order of removal.

3-17. Propeller Shaft Service.

a. Inspection. Inspect propeller shafts (figs. 3-15, 3-16, and 3-17) for good condition and secure mounting. Check bearings and companion flanges for crack and evidence of wear or damage.

b. Service. Lubricate propeller shafts. Refer to LO5-3805-251-12 for proper lubricant and interval.

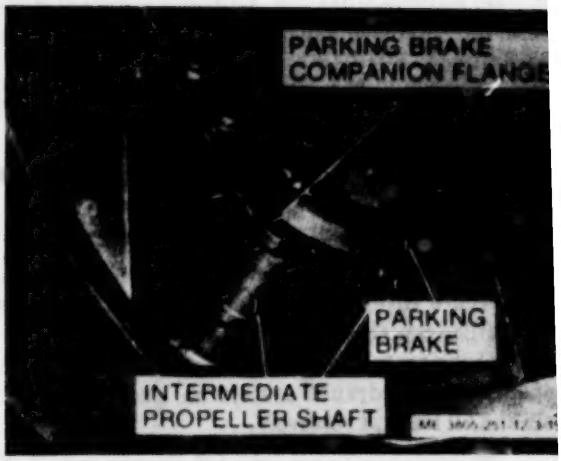


Figure 3-15. Intermediate propeller shaft

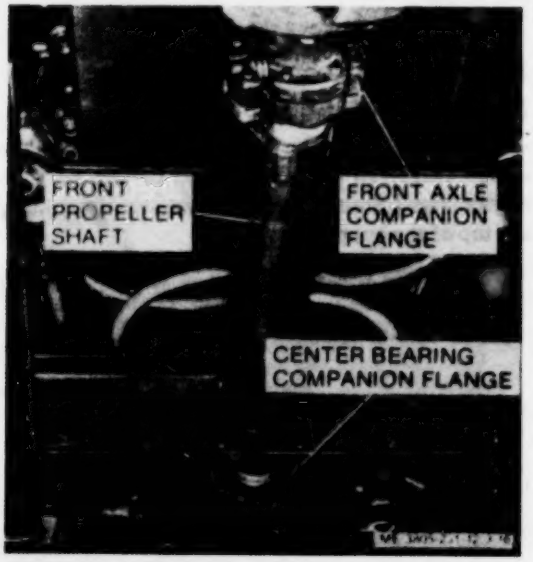


Figure 3-16. Front propeller shaft

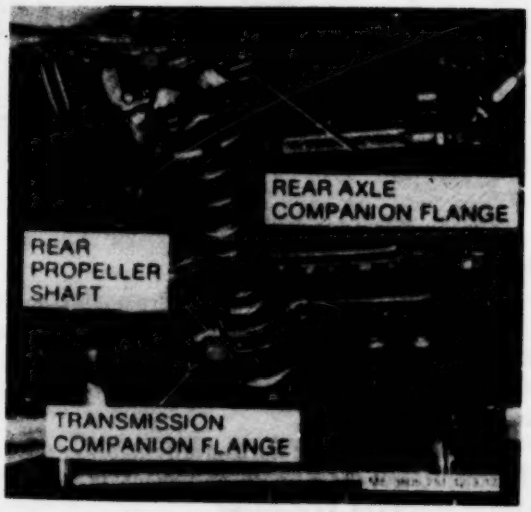


Figure 3-17. Rear propeller shaft

3-18. Fan, Alternator and Compressor Belts Inspection

a. Check belts for wear, cracks and fraying.

b. Check belts for proper adjustment. Deflection should be one-half inch at a point midway between the pulleys.

3-19. Steering Components Inspection

a. Inspect steering gear housing for cracks or other damage.

b. Inspect the mounting brackets and attaching hardware for security.

c. Check hydraulic lines for leaks.

d. Inspect steering cylinders for leaks at the rod end packing.

3-20. Hydraulic Cylinder Inspection

a. Inspect cylinder rod end packings for leaks.

b. Inspect pivot points for an accumulation of dirt or grease.

c. Inspect hoses for cracks, leaks or deterioration.

3-21. Air Reservoirs Service

a. Rear Air Reservoirs. Open the drain cocks (fig. 3-18) on the bottom of the air reservoirs and allow to drain.

b. Auxiliary Air Reservoir. Open the drain cock (fil. 3-18) on extension from the auxiliary air reservoir and allow to drain.

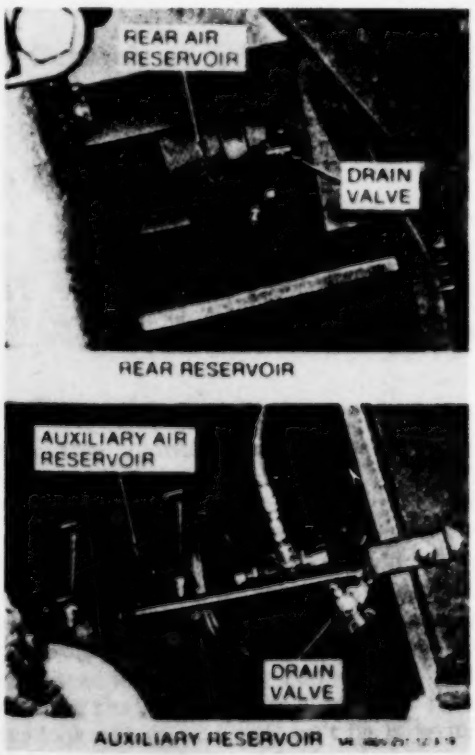


Figure 3-18. Air reservoir drains

3-22. Flow Divider Valve

Inspect flow divider valve (fig. 3-14) for evidence of leakage and damage. Check hoses for good condition and secure connections. Check flow divider valve for secure mounting. Tighten mounting screws if necessary.

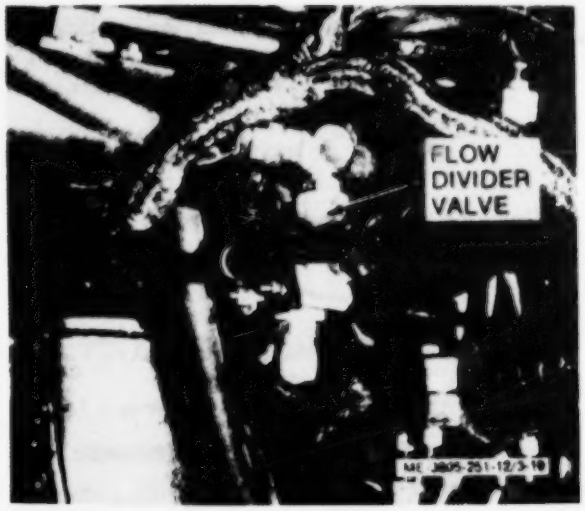


Figure 3-19. Flow divider valve

CHAPTER 4
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

4-1. Inspecting and Servicing the Equipment

No special inspecting and servicing is required of organizational maintenance personnel. Refer to paragraph 2-1 for operator/crew inspecting and servicing requirements.

Section II. MOVEMENT TO A NEW WORKSITE

4-2. General

a. The loader does not require dismantling before moving to a new worksite.

b. Movement instructions for organizational maintenance personnel are the same as for the operator (para 2-3).

Section III. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-3. Tools and Equipment

Tools and equipment issued with, or authorized for the MW24B Scoop Loader are listed in the Basic Issue Items List, appendix C.

4-4. Special Tools and Equipment

No special tools are required to perform organizational maintenance on the loader.

4-5. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tools list for the loader, TM 5-3805-251-20P.

Section IV. LUBRICATION INSTRUCTIONS

4-6. General

This section contains lubrication instructions to supplement the LO 5-3805-251-12.

4-7. Detailed Instructions

a. General. Keep all lubricants in closed containers and store in a clean dry place away from external heat. Prevent dust, dirt, and other foreign material from contaminating the lubricant.

b. Cleaning. Keep all external parts which do not require lubrication clean of lubricants. Before and after lubricating, clean lubrication points.

c. Points of Lubrication. Service the points of lubrication at the required intervals. Refer to LO 5-3805-251-12.

Section V. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-8. General

Preventive maintenance is detecting/correcting problems before they happen, or fixing little problems before they become big problems. Table 4-1 contains a list of preventive maintenance checks and services to be performed by organizational maintenance personnel. Attention to these checks and services will increase the useful life of the equipment, but every possible problem cannot be covered in the PMCS. You need to be alert for anything that might cause a problem. If anything does look wrong, and you can't fix it, write it on a DA form 2404 and report it to your supervisor. Be sure to record any corrective action.

4-9. Organizational Preventive Maintenance Checks and Services

a. Perform the checks and services at the intervals shown in table 4-1.

(1) Do the (Q) checks and services once each three months.

(2) Do the (S) checks and services twice a year, or each six months.

(3) Do the (A) checks and services once each year.

(4) Do the (B) checks and services once each two years.

(5) Do the (H) checks and services at the hour interval listed.

(6) Do the (MI) checks and services when the mileage of the vehicle reaches the amount listed.

b. If the scoop loader doesn't work properly and you can't see what is wrong, refer to table 4-2 for troubleshooting instructions.

WARNING

Drycleaning solvent SD-2, used to clean parts, is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 138° F.

c. Make cleanup a part of your preventive maintenance. Dirt, grease, oil, and debris may cover up a serious problem. Use drycleaning solvent (SD-2) to clean metal surfaces. Use soap and water when you clean rubber or plastic material.

d. Watch for and correct anything that might cause a problem with the equipment. Some things to watch for are:

(1) Bolts, nuts, and screws that are loose, missing, bent, or broken.

(2) Welds that are bad or broken.

(3) Electric wires and connectors that are bare, broken, or loose.

e. You should know how fluid leaks affect the status of your equipment. Learn and be familiar with the following definitions of the types/classes of leakage.

Leakage definitions for PMCS are:

Class I — Seepage of fluid (indicated by w ness or discoloration) not gr enough to form drops.

Class II — Leakage of fluid great enough form drops but not enough cause drops to drip from the it being checked/inspected.

Class III — Leakage of fluid great enough form drops that fall from the it being checked/inspected.

WARNING

Equipment operation is not permitted when any form of fuel leakage is detected (Class I, II, or III leaks).

CAUTION

Equipment operation is allowable with minor leakage (Class I or II). Of course, consideration must be given to the fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required by the PMCS.

Class III leaks should be corrected before releasing equipment for operation.

Table 4-1. Organizational Preventive Maintenance Checks and Services

Legend

Q-Quarterly S-Semiannually A-Annually B-Biennially H-Hours MI-Miles

Item no.	Interval Q	S	A	B	H	MI	ITEM TO BE INSPECTED Procedure
							NOTE PERFORM OPERATOR/CREW PMCS PRIOR TO OR IN CONJUNCTION WITH ORGANIZATIONAL PMCS.
1		●					FIRE EXTINGUISHER Check that fire extinguisher is in proper place. Replace if weight is less than 4½ pou or pressure is below 125 pounds.
2							COOLING SYSTEM
			●				*a.* Check radiator for damage or obstructions. Remove any debris which would rest air flow.
			●				*b.* Inspect hoses and lines for evidence of leaks, abrasions, kinked or restricted ar and insecure mounting.
			●				*c.* Check antifreeze protection. (See TB 750-651.)
3							BRAKE SYSTEM
		●					*a.* Inspect hoses, lines, tank, and fittings for leaks.
		●					*b.* Check hand brake for proper operation. Adjust as necessary.
		●					*c.* Check the brake shoe travel at the rod on the master cylinder. (Para 4-47)
4			●				UNIVERSAL JOINTS Inspect for excessive wear or looseness.
5			●				FRONT AND REAR AXLES Inspect for leaks. Check steering rods for excessive wear.
6							WHEELS AND TIRES
		●					Tighten lug nuts to torque of 380 to 420 pound-feet.
7			●				V-BELTS Check for proper belt adjustment. Proper belt adjustment will permit a 1/2-inch deflection midway between pulleys.
8							BATTERIES

Table 4-1. Organizational Preventive Maintenance Checks and Services – Continued

Item no.	Interval Q	S	A	B	H	MI	ITEM TO BE INSPECTED Procedure
							WARNING Do not smoke or allow open flame in vicinity while checking or filling battery. The battery generates hydrogen, a highly explosive gas.
		●					*a.* Remove corrosion from clamps and posts.
		●					*b.* Check for obvious defect such as cracked case, burnt, broken or loose battery terminals.
		●					*c.* Tighten loose cables and mountings.
		●					*d.* Check specific gravity of electrolyte in each cell. (See TM 9-6140-200-14.)

Section VI. TROUBLESHOOTING

4-10. General

Table 4-2 provides information for diagnosing and correcting improper operation of failure of the loader components. Each trouble symptom is followed by a list of probable causes and possible remedies. Refer any trouble beyond the scope of organizational maintenance to direct and general support maintenance personnel.

Table 4-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Engine fails to turn over.	a. Defective neutral start switch.	a. Replace switch (para 4-45).
	b. Weak or defective batteries.	b. Charge or replace (para 4-32).
	c. Defective starter.	c. Replace (para 4-34).
	d. Defective auxiliary start solenoid.	d. Replace solenoid (para 4-35).
	e. Defective polarity protector.	e. Replace polarity (para 4-35).
	f. Defective diode.	f. Replace diode (para 4-35).
2. Engine cranks but fails to start.	a. Cranking speed too slow.	a. Charge or replace batteries (para 4-32).
	b. Insufficient fuel.	b. Check fuel system and add as necessary (para 4-16).
	c. Fuel injection nozzles not receiving fuel.	c. Check fuel system (para 4-17).
3. Engine hard to start.	a. Insufficient fuel or incorrect grade.	a. Check tank and fill with correct grade. (para 3-9).
	b. Clogged filter or sediment.	b. Check fuel system and service filter (para 3-10).
	c. Insufficient air to engine.	c. Check and service air cleaner. Replace element if necessary (para 3-8).
4. Engine stalls.	Restricted fuel supply or air in fuel system.	Check fuel system and correct (para 4-17).
5. Engine stops suddenly.	a. Fuel tank empty.	a. Fill fuel tank (para 3-9).
	b. Restricted fuel supply or damaged fuel lines.	b. Check fuel system and correct (para 4-17).
6. Engine overheats.	a. Coolant level low.	a. Check and fill radiator (para 3-11).
	b. Radiator air passages clogged.	b. Clean radiator (para 4-25).
	c. Fan belts loose or damaged.	c. Adjust belts (para 4-26), or replace (para 4-26).
	d. Defective thermostat.	d. Replace (para 4-28).
7. Engine power low.	a. Insufficient air to cylinders.	a. Check fuel system. Service air cleaner (para 3-8). Replace element if necessary (para 3-8).
	b. Insufficient fuel to nozzles.	b. Check fuel system and correct (para 4-17).
8. Engine runs unevenly, and vibrates excessively.	a. Fuel supply erratic or insufficient.	a. Check fuel system and correct (para 4-17).
	b. Engine operating temperature too low.	b. Check thermostat (para 4-28) and replace.
9. Engine emits black smoke in exhaust.	Insufficient air to cylinders.	Check and service air cleaner. Replace element if necessary (para 3-8).
10. Engine oil pressure low.	a. Crankcase oil level low.	a. Check oil level and fill (para 3-7).
	b. External oil leak.	b. Check oil lines.
	c. Defective oil pressure gage.	c. Replace gage (para 4-36).
11. Starter does not crank engine.	a. Batteries weak.	a. Charge or replace batteries (para 4-32).
	b. Loose connections or cables.	b. Clean terminals and tighten connections (para 4-34).
	c. Defective starter switch.	c. Replace switch (para 4-34).
	d. Defective starter.	d. Replace starter (para 4-34).
12. Electrical system not providing power.	a. Batteries weak.	a. Charge or replace batteries (para 4-32).
	b. Defective cables.	b. Clean and tighten cables or replace (para 4-32).
	c. Defective alternator.	c. Replace (para 4-33).
13. Alternator not charging.	a. Broken or loose belt.	a. Adjust (para 4-26) or replace (para 4-26).
	b. Defective voltmeter.	b. Replace (para 4-63).
	c. Defective polarity protector.	c. Replace polarity protector (para 4-35).
14. Loader lights do not illuminate.	a. Lamps burned out.	a. Replace (para 4-37).
	b. Defective circuit breaker.	b. Replace (para 4-35).
	c. Loose wire connections.	c. Check wiring and tighten connections (para 4-37).
	d. Defective light switch.	d. Replace switch (para 4-37).
15. Air intake system not operating properly.	a. Clogged air cleaner.	a. Service (para 3-8).
	b. Defective air hoses and piping.	b. Check and replace as necessary (para 3-8).
16. Exhaust system not operating properly.	a. Restricted exhaust pipe.	a. Inspect and clean (para 4-22).
	b. Loose or defective clamps.	b. Tighten or replace clamps (para 4-22).
17. Loader will not move.	a. Engine power low.	a. Refer to item 7.
	b. Transmission oil level low.	b. Check and replenish (para 4-45)
18. Loader does not steer properly.	a. Oil level low.	a. Check and replenish (para 3-12).
	b. Leaky or defective hydraulic lines.	b. Tighten connections or replace lines (para 3-12).

Malfunction	Probable Cause	Corrective Action
19. Bucket arms do not lift or lower.	a. Low hydraulic oil.	a. Check and replenish (para 3-12).
	b. Clogged hydraulic filter.	b. Replace filter (para 3-12).
	c. Leaky or defective lines.	c. Tighten connections or replace (para 3-12
20. Bucket does not operate properly.	a. Low hydraulic oil.	a. Check and replenish (para 3-12).
	b. Clogged hydraulic filter.	b. Replace filter (para 3-12).
	c. Leaky or defective hydraulic lines.	c. Tighten connections or replace (para 3-12)
21. Wheel brakes do not stop loader.	a. Insufficient air pressure.	a. Check air system and correct.
	b. Insufficient hydraulic fluid in actuator.	b. Check and replenish (para 4-47).
	c. Air in brake system.	c. Bleed brake system (para 4-47).
	d. Brakes not properly adjusted.	d. Adjust brakes (para 4-47).
	e. Leaky brake lines.	e. Tighten connections (para 4-47).
	f. Compressor belt loose.	f. Adjust belt (para 4-26).
	g. Leaky or defective air lines.	g. Tighten connections or replace air lines.
22. Parking brake does not hold.	Lever or linkage out of adjustment.	Adjust (para 4-46).

Section VII. RADIO INTERFERENCE SUPPRESSION

4-11. General

a. General Methods Used to Attain Proper Suppression. Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. The methods used include shielding the ignition and high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

b. Interference Suppression Components. Suppression components include a 0.1 microfarad capacitor connected to the horn switch, a 24 volt diode connected to the high converter temperature warning buzzer, and a 24 volt diode connected to the low air pressure warning light. Refer to figure 1-3 for the loader wiring diagram.

4-12. Replacement

a. To remove diodes or the horn switch capacitor tag and disconnect wiring.

b. Install new diodes or capacitor and connect wiring. Refer to figure 1-3.

Section VIII. MAINTENANCE OF THE ENGINE LUBRICATION SYSTEM

4-13. General

The engine lubrication system consists of the oil pan, oil pump, oil filters and oil cooler. Lubricating oil is pumped to the engine cylinders and to the turbocharger to lubricate wear parts and also oil in cooling the engine.

4-14. Oil Filter and Breather Service

a. Oil Filter.

(1) Start the engine and allow the engine oil to reach normal operating temperature. Shut down the engine.

(2) Remove the drain plug from the oil pan and drain the lubricating oil from the engine.

(3) Remove the engine left side panel.

(4) Remove oil filter (fig. 4-1) by removing retaining bolt and removing case from filter.

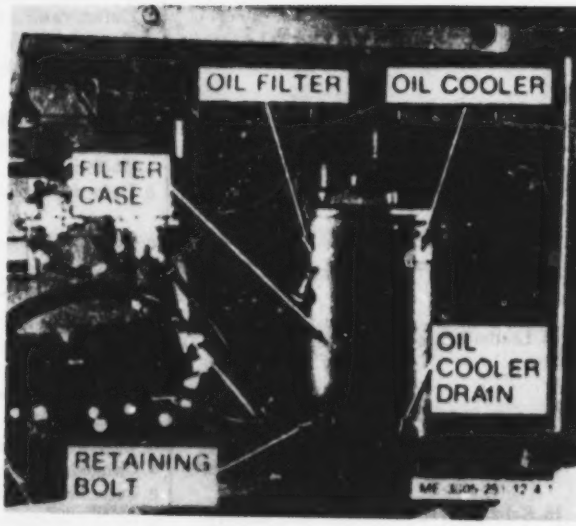


Figure 4-1. Engine oil filter and cooler

(5) Remove element from case and discard. Change oil filter element every 200 hours.

(6) Clean case and install new filter element in case. Apply thin coat of grease to new case gasket. Install case on filter head and secure with retaining bolt.

(7) Install the oil pan drain plug and fill the crankcase with 19 quarts of engine oil. Refer to paragraph 3-7 for engine servicing instructions.

(8) Install the engine side panel.

b. Crankcase Breather.

(1) *Removal.*

(a) Remove engine left side panel and left side of hood. (para 4-51).

(b) Remove screws and washers securing turbocharger brace (fig. 4-2) and spacer to manifold, and brace to turbocharger exhaust elbow. Remove brace.

(c) Remove three screws, washers, and gaskets (fig. 4-2) securing the breather tube to the rocker arm cover. Discard the gaskets.

(d) Remove two bolts and washers which secure the breather tube bracket to the oil pan.

(e) Remove breather tube from engine.

(2) *Service.* Remove the tube and check for restrictions. Clean with solvent.

(3) *Installation.* Install breather tube by reversing the removal procedure.

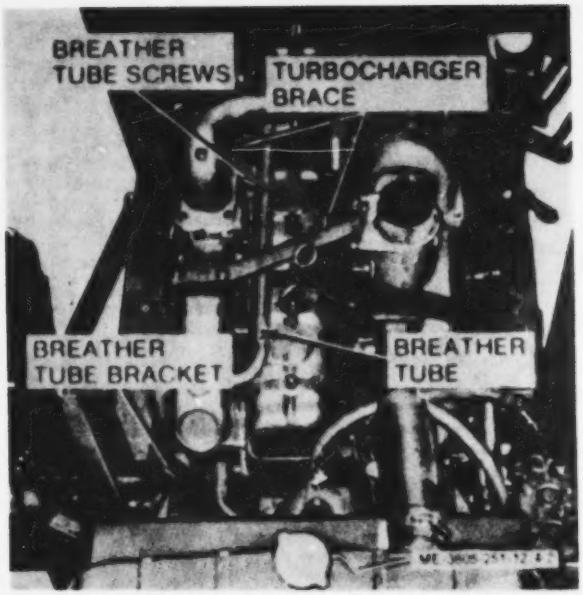


Figure 4-2. Crankcase breather

4-15. Hose, Lines and Fittings Replacement

Inspect engine lubrication system hose, lines and fittings for deterioration or damage which may result in leaks. Replace defective items with my components. Tighten fittings securely.

Section IX. MAINTENANCE OF THE FUEL SYSTEM

4-16. Electric Fuel Pump

a. General. The electric fuel pump, mounted on the fuel tank, transfers fuel from the tank to the transfer pump mounted on the fuel injection pump.

b. Removal.

(1) Remove the engine right side panel.

(2) Disconnect the electrical connector (fig. 3-6).

(3) Remove elbow nut, sleeve, and elbow connecting the fuel tank suction line (fig. 3-6) to the fuel pump inlet port.

(4) Remove the connector, elbow, and nipple securing the outlet line to the fuel pump outlet port.

(5) Remove the two screws and washers securing the fuel pump to the fuel tank, and remove the fuel pump.

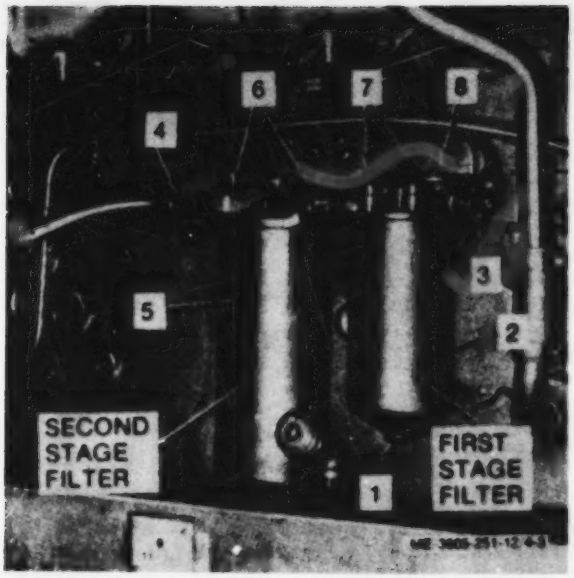
c. Installation. Install pump in reverse order of removal.

4-17. Fuel Filters

a. General. The fuel filter assembly, mounted on the right side of the engine, consists of a primary and secondary filter. The filters remove air and impurities from the fuel before it is pumpted into the fuel injection pump.

b. Removal.

(1) Remove the drain plug (1, fig. 4-3) from the first stage filter (2) and drain the filters.



1. Drain plug
2. First stage filter
3. Fuel tube
4. Hose
5. Second state filter
6. Screws
7. Screw
8. Mounting bracket

Figure 4-3. Engine fuel filters

(2) Disconnect the tube (3) to the first stage filt and the hose (4) to the second stage filter (5).

(3) Remove two screws and lockwashers (6) securing the second stage filter to the frame.

(4) Remove four screws and lockwashers (7) securing the first stage filter to the mounting bracket (8). Remove the filter assembly from the loader.

c. Installation. Install the filters in the reverse order of removal.

4-18. Accelerator Controls and Linkages

a. General. The accelerator is connected by a cable to the speed control lever on the fuel injection pump governor. This cable is connected to the lever and pedal with ball joints.

b. Removal.

(1) Remove screws (1, fig. 4-4) nuts (2), lock washers (3) and remove clamp (4) and shim (5) from cable assembly.

1. Screw
2. Nut
3. Lock washer
4. Clamp
5. Shim
6. Nut
7. Lock washer
8. Ball joint
9. Accelerator cable assembly
10. Nut
11. Seal
12. Seal
13. Nut
14. Lock washer
15. Ball joint
16. Throttle return spring
17. Screw
18. Flat washer
19. Lock washer
20. Nut
21. Spring plate
22. Retaining ring
23. Pivot pin
24. Accelerator pedal
25. Pad
26. Screw
27. Nut
28. Lock washer
29. Mounting block
30. Clamp
31. Fuel shutoff cable
32. Screw
33. Lock washer
34. Bracket

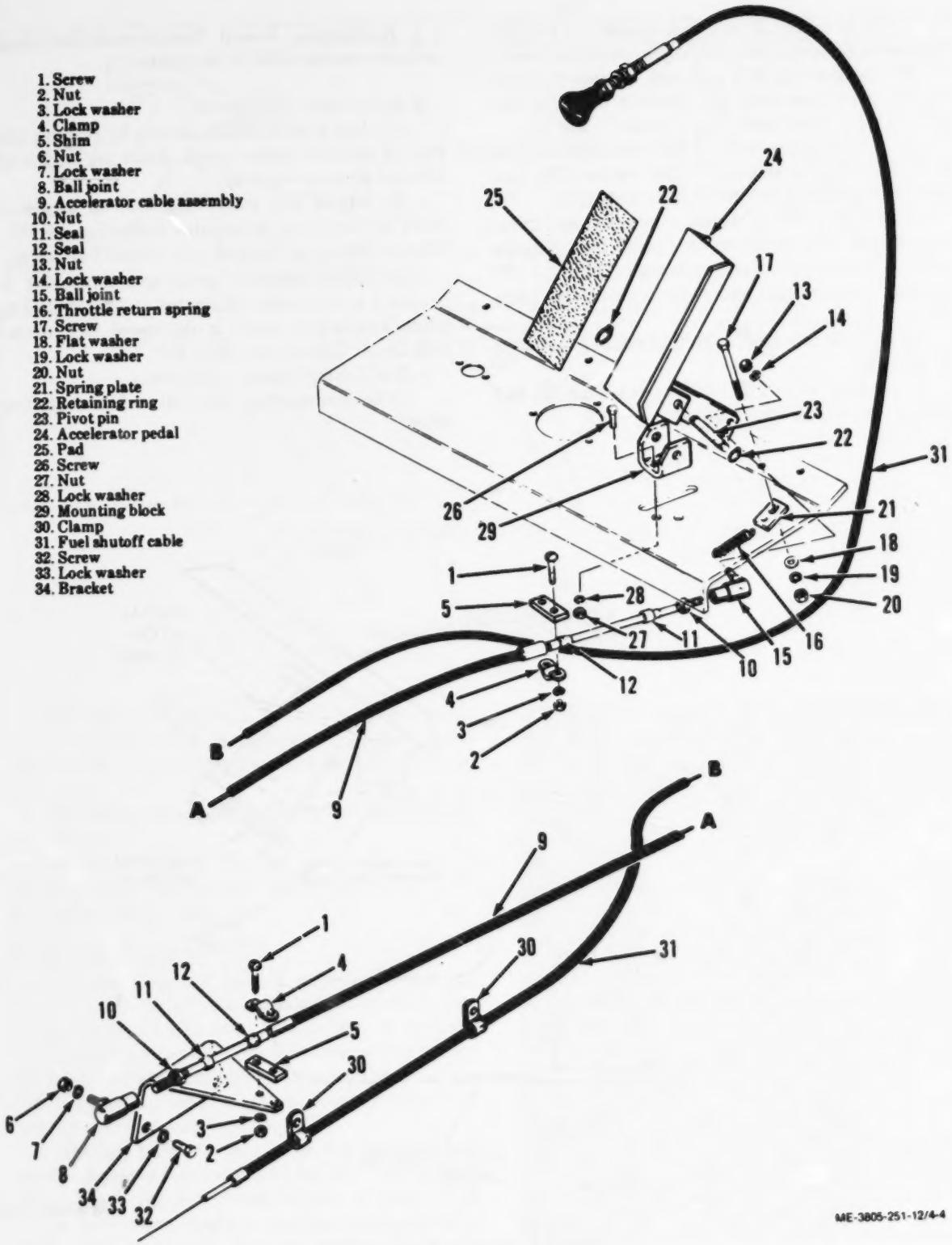


Figure 4-4. Accelerator and fuel shutoff cables, exploded view

(2) Remove nut (6) and lock washer (7) and disconnect ball joint (8) from fuel injection pump lever.

(3) Remove nut (13) and lock washer (14) and remove cable assembly (9). Remove nut (10) and ball joint (15). Check condition of seals (11 and 12).

(4) Disconnect spring (16) from accelerator pedal and plate. Remove screw (17), flat washer (18), lock washer (19) and nut (20) and remove plate (21).

(5) Remove two retaining rings (22) and pivot pin (23) and remove accelerator pedal (24). Remove pad (25) from pedal. Remove screws (26), nuts (27) and lock washers (28) and remove mounting block (29).

(6) Remove two clamps (30) and remove fuel shutoff cable (31).

(7) Remove screws (32) and lockwashers (33) and remove bracket (34) from engine.

c. Installation. Install throttle and fuel shutoff cables in reverse order of removal.

d. Accelerator Adjustment.

(1) Use a tachometer capable of reading 2500 rpm to monitor engine speed. Start the engine (fig. 2-6) and allow to warm up.

(2) Adjust ball joints (fig. 4-5) on accelerator cable to obtain a tachometer indication of 750 to 825 rpm idle speed. Tighten jam nuts on ball joints.

(3) Adjust length of pedal stop screw (fig. 4-5) to obtain a tachometer indication of 2300 to 2375 rpm when accelerator pedal is depressed and contacts stop screw. Tighten mounting nut.

e. Fuel Shutoff Cable. Adjustment

(1) Loosen setscrew (fig. 4-6) on fuel shutoff arm pivot.

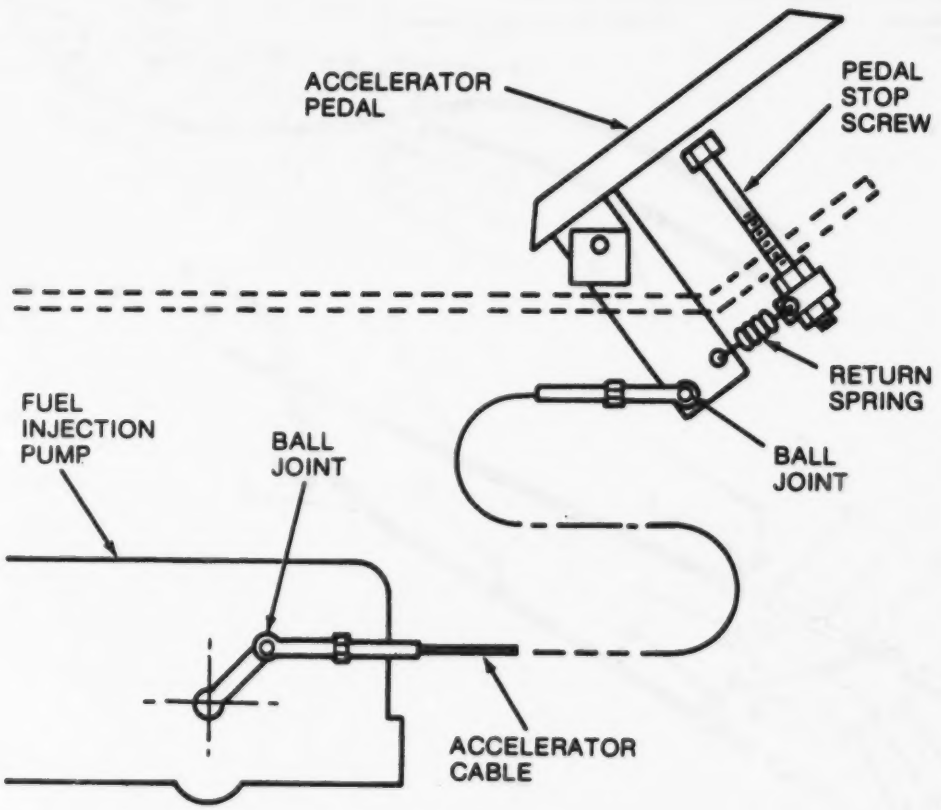


Figure 4-5. Accelerator cable adjustment

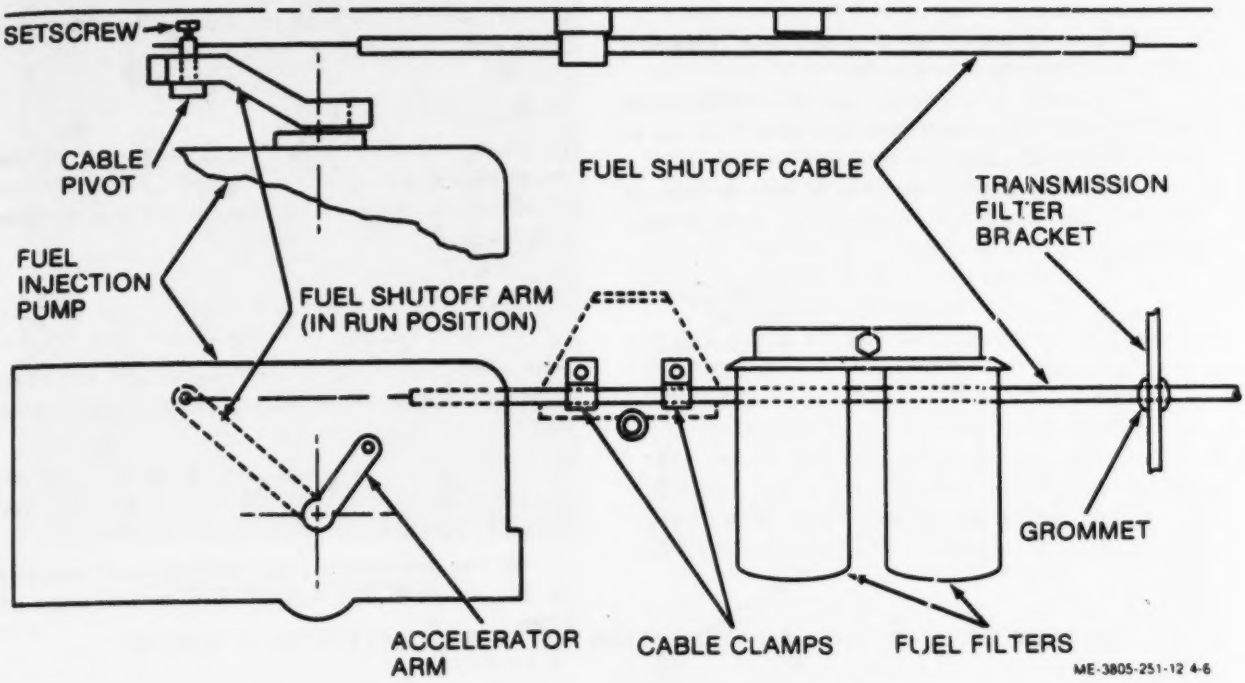


Figure 4-6. Fuel shutoff cable adjustment

(2) Push shutoff knob in until it seats against the mounting ferrule on instrument panel. If necessary loosen cable clamps to position cable in shutoff arm pivot.

(3) Tighten cable pivot setscrew and cable clamps if loosened.

(4) Start engine (fig. 2-6) and allow to run momentarily. Pull shutoff cable knob all the way out. Engine should stop.

4-19. Fuel Tank

a. General. The fuel tank is mounted at the rear of the vehicle below the radiator. A dipstick, just inside the left frame (fig. 3-3) is used to measure fuel in tank. A filler neck (fig. 3-3) extends out beyond the frame for easy access. Attached to the top of the fuel tank are outlet and return hoses, a vent tube, and the electric fuel pump (fig. 3-6).

b. Service. Refer to paragraph 3-9 for fuel tank service. Remove fuel tank cap (fig. 4-7) and remove filler screen (fig. 4-7). Clean screen in clean diesel fuel and blow dry. Replace damaged screen or damaged filter cap. Check filler cap gasket. Replace if damaged or deteriorated.

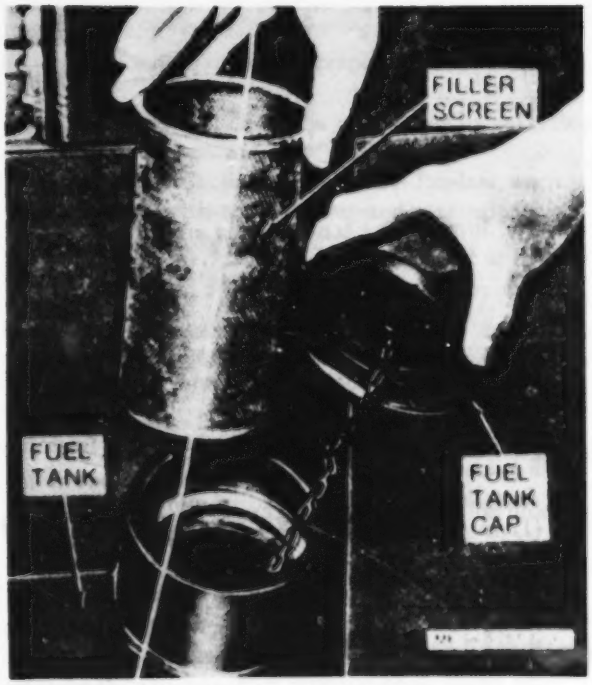


Figure 4-7. Fuel tank inlet screen

c. Removal.

(1) Refer to paragraph 4-16 and remove electric fuel pump from top of fuel tank.

(2) Disconnect fuel outlet and return lines from top fuel tank. Disconnect breather tube from top of tank. Remove dipstick from tank.

(3) Open drain cock (fig. 4-8) at bottom front of fuel tank and allow fuel to drain into suitable container.

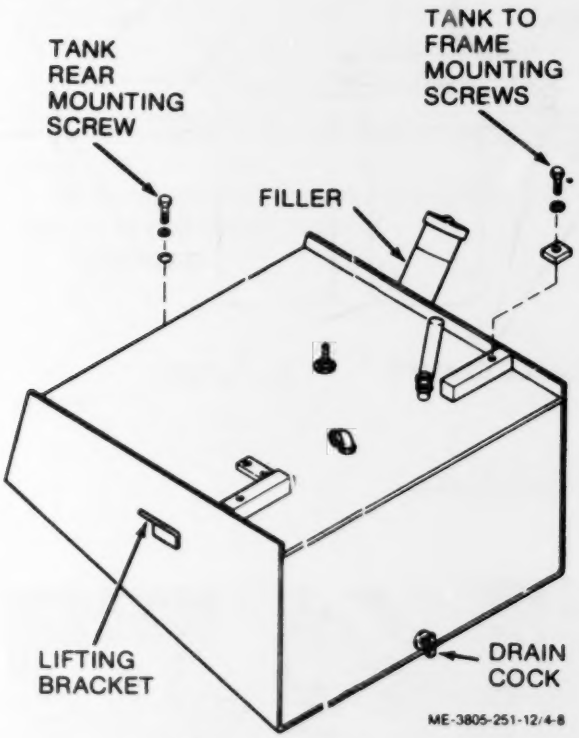


Figure 4-8. Fuel tank

(4) Support the tank with a suitable hoist connected to lifting brackets (fig. 4-8) or with a suitable jack placed beneath tank.

(5) Remove two screws, lock washers and flat washers securing upper corners of tank to frame. Remove one screw, lock washer and flat washer securing rear flange of tank to frame.

(6) Lower tank to ground and remove from beneath loader.

d. Installation.

(1) Install fuel tank by reversing the removal procedure.

(2) Coat fitting pipe threads with sealant and connect outlet and return lines to tank. Connect breather tube to tank. Install dipstick.

(3) Refer to paragraph 4-16 and install electric fuel pump on top of tank.

(4) Service fuel tank (para 3-9). Check tank and connections for leaks.

4-20. Cold Start Kit

***Caution:* Do not install cold start kit cylinder when operating in warm climates or hot weather. Inadvertent injection of ether could cause severe explosion.**

a. General.

(1) A cold start kit is installed in the loader to permit easy starting in cold weather. The kit consists of an atomizer in the intake manifold, a cylinder serviced with ether, a valve, electric connections, and a cab-mounted switch.

(2) When the switch is pressed, the valve transfers ether to the atomizer, where it is sprayed into the intake manifold.

(3) The cold start cylinder and valve are mounted on the support just outside the transmission oil filter.

b. Removal.

(1) Remove engine right side panel.

(2) Remove wing nuts securing the ether cylinder bracket (fig. 4-9) in place. Unscrew cylinder from valve, and cap the valve.

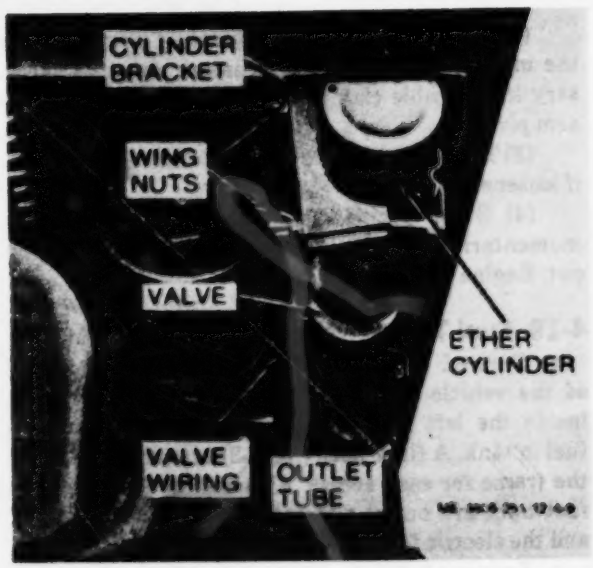


Figure 4-9. Cold start cylinder and valve

(3) Disconnect valve wiring.

(4) Remove outlet tube from the valve and atomizer and disconnect the clamp securing the tube in place. Remove the atomizer (fig. 4-10) from the manifold.

Figure 4-10. Cold start atomizer

(5) Remove two nuts, washers, lockwashers, and screws securing the valve in position. Remove the valve from the loader.

c. Installation.

(1) Position the valve (fig. 4-9) and secure with two nuts, washers, lock washers, and screws.

(2) Install the atomizer (fig. 4-10) into the intake manifold.

(3) Connect the outlet tube to the atomizer and the valve. Secure the tube with clamp.

(4) Connect valve wiring.

(5) Screw the cylinder into the valve. Secure the cylinder bracket in position with two screws and wing nuts.

(6) Actuate the system and check for leaks.

d. Service. Servicing the cold start kit consists of replacing the ether cylinder with a full cylinder. Remove the cylinder mounting bracket and unscrew cylinder from the valve. Replace with a new cylinder.

Section X. MAINTENANCE OF THE AIR INDUCTION AND EXHAUST SYSTEM

4-21. Air Cleaner

a. General. The air cleaner, mounted above the right fender, removes solid particles from atmospheric air before the air is directed to the engine cylinders.

b. Removal.

(1) Loosen the clamp (fig. 4-11) securing the outlet line to the air cleaner.

Figure 4-11. Air cleaner

(2) Disconnect the air cleaner indicator tube and air compressor hose.

(3) Support the air cleaner and remove four nuts, screws and washers securing the air cleaner mounting brackets to the side of the hood.

(4) Lift the air cleaner and remove from the loader.

c. Service. Refer to paragraph 3-8 and service the air cleaner.

d. Installation. Install the air cleaner by reversing the removal procedure.

e. Hose and Clamp Replacement. Replace worn or broken hose with a new hose, and clamp into position. Replace broken clamps.

4-22. Exhaust Pipe

a. General. The exhaust pipe is mounted on the top of the hood and provides an outlet passage for exhaust gases.

b. Inspection.

(1) Inspect the exhaust pipe for an accumulation of dirt or any foreign matter in the passage.

(2) Check for signs of corrosion and for holes in the pipe.

(3) Ensure that the pipe is held securely in position.

c. Removal.

(1) Remove two nuts and lockwashers from the threaded ends of the U-bolt (fig. 4-12).

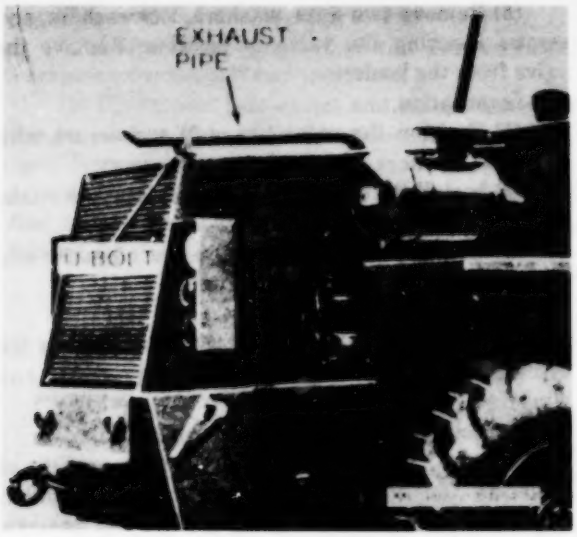


Figure 4-12. Exhaust pipe

(2) Loosen the clamp securing the exhaust pipe to the exhaust elbow.

(3) Lift the exhaust pipe up from the loader, carefully working the exhaust elbow end through the hole on top the hood.

d. Installation. Install the exhaust pipe by reversing the removal procedure.

Section XI. MAINTENANCE OF THE COOLING SYSTEM

4-23. General

The engine cooling system consits of the radiator, water pump, thermostat and hoses and tubes. Air drawn through the radiator cools the coolant and allows the engine to operate within the heat limits.

4-24. Cleaning

Note. Cooling system should be cleaned at least once a year. In areas of hard water, clean system more often.

a. Add a cooling system cleaner to the radiator and follow directions provided with the cleaner. If a cleaner is not available, flush the system using clean water. Open drain cocks (fig. 3-8) in crankcase and radiator and drain system. Open drain valve (fig. 4-1) on oil cooler to drain cooler. Remove thermostat housing and thermostats (para 4-28). Using a hose, flush water through thermostat housing opening and allow to drain from crankcase and oil cooler. Continue flushing system until water leaving engine is clean. Follow same procedure and flush clean water through radiator. Install thermostat housing (para 4-28) and thermostats. Close drain cocks and fill system with proper coolant.

***Caution:* When using compressed air for clean ing or drying puposes, use only low pressure (3 psi or less) air.**

b. Clean exterior of radiator using water or com pressed air to remove dirt from fins and tubes.

c. In winter months service radiator with ant freeze.

d. In summer months service radiator with wat and rust inhibitor.

4-25. Fan Guards and Shroud

a. General. The shroud, attached to the radiat directs air through the radiator to provide a bett distribution of air. Fan guards are secured to t shroud.

b. Replacement. Remove the engine access pane Remove four screws and lockwashers securing ea of the guards (fig. 4-13) to the radiator and remo from the loader. Install the guards by reversing t removal procedure.

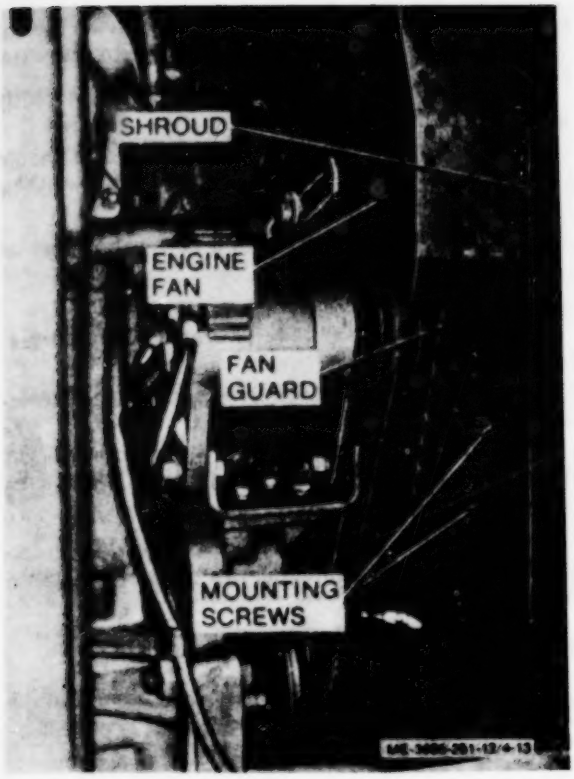


Figure 4-13. Fan guard and shroud

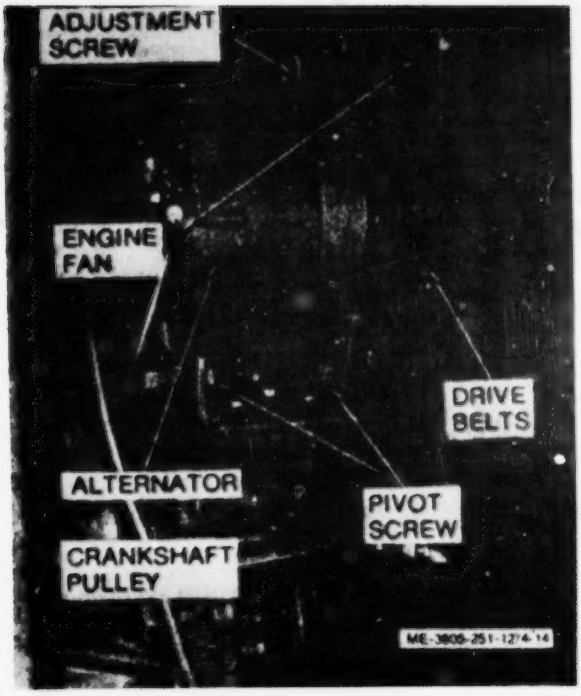


Figure 4-14. Fan and alternator belts

4-26. Fan and Alternator Belts

a. General. Two fan belts, routed around the crankshaft pulley, fan pulley and alternator pulley, transfer rotary motion of the engine crankshaft to drive the alternator and the water pump.

b. Replacement.

(1) Remove the air compressor drive belt by loosening compressor mounting bolts and moving compressor in towards engine.

(2) Loosen the alternator pivot and adjustment screws (fig. 4-14).

(3) Remove the belts over fan. Slip new belts over the fan and onto the fan pulley, crankshaft pulley, and alternator pulley.

(4) Adjust the belt tension (*c* below).

(5) Install the air compressor drive belt and adjust tension by moving compressor mounting bolts in slots provided in base.

Note. The fan belts must be replaced as a set.

c. Adjustment.

(1) Check belts at a point midway between the alternator and fan pulleys. Deflection should be 1/2 inch.

(2) To increase tension, loosen the alternator pivot and adjustment screws. Position a small pry bar behind the alternator and pull against the fan belts. Tighten pivot and adjustment screws when proper tension is obhained.

(3) To decrease tension, loosen the alternator pivot and adjustment screws and move the alternator inward. Tighten pivot and adjustment screws when proper tension is obtained.

(4) Check belt tightness after every 40 hours of operation.

4-27. Engine Fan

a. Removal.

(1) Remove engine left side panel.

(2) Remove left fan guard (para 4-25).

(3) Remove four mounting screws and lock washers and remove fan (fig. 4-14).

b. Cleaning Inspection and Repair.

(1) Clean fan with solvent.

(2) Inspect fan blades for bends, dents and cracks. Straighten any blades that are out of line.

(3) Check fan blades to be sure rivets are not loose and blades are held securely in position.

c. Installation.

(1) Install fan in reverse of removal procedure.

(2) Install left fan guard (para 4-25).

4-28. Thermostats

a. General. The two thermostats are enclosed in a housing mounted on the water manifold. When the engine temperature reaches 180°F, the thermostats open to allow coolant to flow from the engine block through the manifold to the radiator.

Note. If engine overheats or does not reach and maintain minimum temperature, replace the thermostat.

b. Removal.

(1) Drain the cooling system.

(2) Disconnect the clamp (fig. 4-15) securing the upper radiator hose to the thermostat housing.

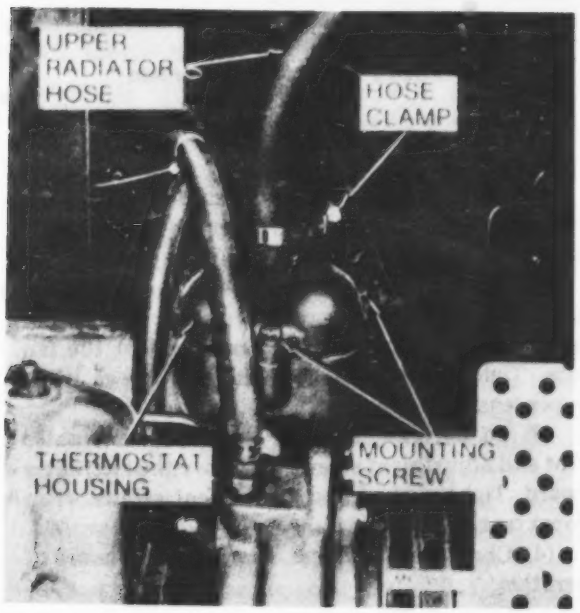


Figure 4-15. Thermostat, removal and installation

(3) Remove three screws and lock washers securing the housing to the manifold and remove housing. Discard the attaching gasket. Remove the two thermostats from the manifold.

c. Testing.

(1) Suspend the thermostat by a wire and completely immerse in a pan of clean water placed on a heater. Do not allow the thermostat to touch the sides or bottom of the pan. Insert an accurate thermometer capable of reading up to 220° F into the water.

(2) Slowly heat the water while stirring gently to distribute the heat.

(3) Observe the thermostat closely. It should begin to open between 175° and 182°F and should be fully open at 202°F.

(4) Replace the thermostat if it does not open at the proper temperature.

d. Inspection.

(1) Inspect radiator hose for cracks and deterioration and replace as necessary.

(2) Inspect housing for leaks and replace if necessary.

e. Housing Replacement. Install a new housing if the thermostat housing is cracked, chipped, distorted or otherwise damaged so that coolant can leak out.

f. Installation. Install the thermostats by reversing the removal procedure. Service the cooling system and check for leaks.

4-29. Lines, Fittings, Hose and Clamps

a. General. The lines, fittings, hose, and clamps form the network through which coolant is distributed to the cooling system components.

b. Inspection.

(1) Inspect hose for cracks and deterioration. Replace if necessary.

(2) Check tubes for damage and replace as necessary.

(3) Inspect lines for obstructions and clean as required.

(4) Check fittings for leaks. Install new gaskets if necessary.

(5) Check clamps for tight fit. Replace if necessary.

c. Replacement. Replace worn, damaged, or defective components with new components.

d. Repair. In emergency situations, broken or damaged hose may be repaired by taping or binding and lines may be repaired by brazing. Replace defective components when possible.

4-30. Water Pump

a. Removal.

(1) Drain cooling system.

(2) Remove engine left side panel.

(3) Remove left fan guard (para 4-25).

(4) Remove fan belts (para 4-26).

(5) Remove fan (para 4-27).

(6) Remove two screws and lock washers and disconnect oil cooler line (fig. 4-16) from water pump.

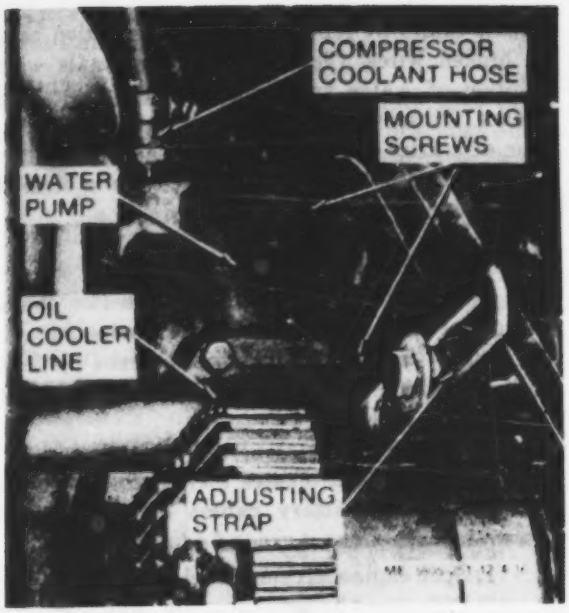


Figure 4-16. Water pump, removal and installation, left side view.

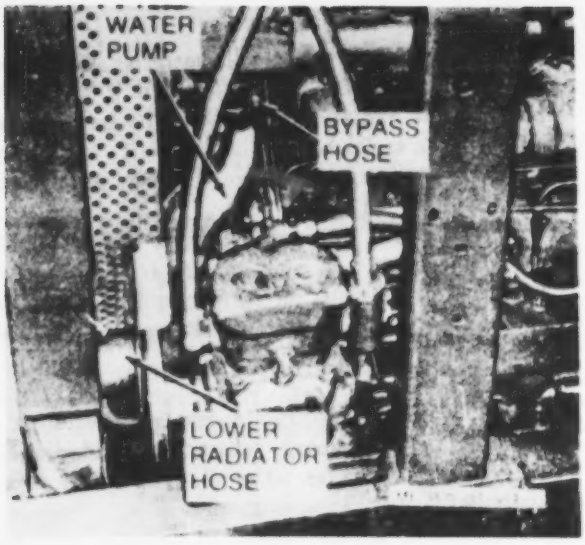


Figure 4-17. Water pump, removal and installation, right side view.

(7) Loosen clamp and disconnect compressor coolant hose (fig. 4-16) from water pump.

(8) Loosen clamp and disconnect lower radiator hose (fig. 4-17) from water pump.

(9) Loosen clamp securing bypass hose (fig. 4-17) to water pump.

(10) Remove four screws (fig. 4-16) and lock wahers and one washer and spacer securing water pump to engine block. Move alternator adjusting strap (fig. 4-16) away from water pump.

(11) Remove water pump (fig. 4-16) and gasket from engine block. Discard gasket.

b. Installation.

(1) Install new gasket and water pump (fig. 4-16) on engine block. Install alternator adjusting strap and secure pump to block with four screws (fig. 4-16), lock washers, washer and spacer. Tighten screws to a torque of 17 to 20-foot-pounds.

(2) Connect compressor coolant hose (fig. 4-16) to top of pump. Install gasket and connect oil cooler line (fig. 4-16) to water pump. Secure with two screws and lock washers.

(3) Connect bypass hose (fig. 4-17) and lower radiator hose to water pump and tighten clamps securely.

(4) Install fan (para 4-27). Install fan belts (para 4-26). Adjust belt tension (para 4-26).

(5) Fill cooling system. Start engine (fig. 2-6). Check all coolant connections for leaks.

(6) Install side panel.

Section XII. MAINTENANCE OF THE ELECTRICAL SYSTEM

4-31. General

***Warning:* Before attempting to make any repairs to the electrical system be sure the master switch is off. Disconnect bbattery cables (fig. 4-18). Disconnect ground cable first.**

a. The electrical system consists mainly of the two storage batteries mounted at the rear of the loader, an alternator mounted on the left side of the engine, an engine starter, loader lights, switches, and instruments.

b. The system is negative grounded.

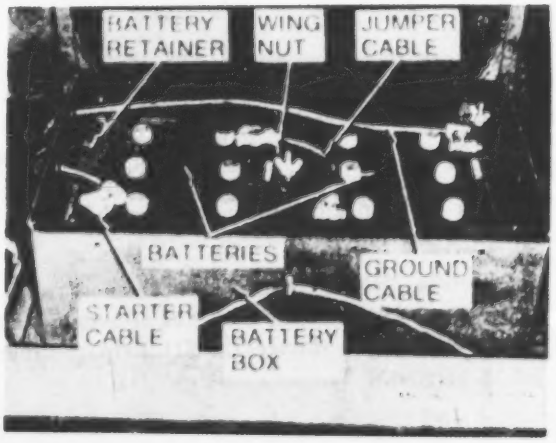


Figure 4-18. Batteries

4-32. Batteries

a. General. Two twelve volt batteries, which store power for the loader, are mounted in a battery box between the radiator and grille. The batteries are connected in series to provide a 24 volt output to the electrical system. A cover on the box protects the batteries.

b. Testing and Charging. Refer to TM 9-6140-200-15, Maintenance of Storage Batteries, Lead-Acid Type for instructions on testing and charging batteries. Use a hydrometer and determine condition of batteries.

c. Service.

(1) Maintain electrolyte level in batteries at three-fourth inch above separators. Add distilled water (or clean water when distilled water is not available).

(2) After adding water in freezing weather, operate the engine for at least thirty minutes to thoroughly mix the electrolyte and water.

(3) Keep battery cable connections clean and free from corrosion.

d. Removal.

(1) Turn master switch off. Open grille to gain access to batteries.

(2) Remove cover from battery box.

(3) Disconnect three battery cables (fig. 4-18). Always disconnect ground cable first.

(4) Remove five wing nuts (fig. 4-18) and washers and remove retainer from top of battery.

(5) Use a suitable battery carrier and lift batteries from battery box.

e. Installation

(1) Install batteries in battery box as shown on figure 4-18.

(2) Install battery retainer (fig. 4-18) and secure with five wing nuts and washers.

(3) Connect battery cables to battery. Connect ground cable last.

(4) Install cover on battery box and close rear grille.

f. Battery Box Replacement. To replace battery box, remove batteries (*d* above). Remove four screws, nuts and washers securing box to frame. Install new or repaired box and install batteries (*e* above). Repair damaged boxes by welding. Clean corrosion from box with an ammonia or sodium bicarbonate solution. Rinse with clear water.

g. Battery Cables. Disconnect cables (*d* above) from battery. Disconnect other ends of negative and positive cables from starter (fig. 21). Remove cables. Repair cables by replacing broken insulation collars or broken wires. Clean corroded terminals with a solution of water and ammonia or sodium bicarbonate. Rinse with clear water. Connect cables to rear of starter (fig. 4-21) and to battery (*e* above). Coat battery terminals with light coating of grease (GAA) after connecting.

4-33. Alternator

a. General. The alternator is mounted on the left side of the engine and driven by two belts. Alternating current is rectified to direct current by diodes built into the alternator. Voltage regulation is also built into the alternator.

b. Removal.

***Warning.* Turn master switch to off position and disconnect battery cables before removing alternator. Disconnect ground cable first.**

(1) Open engine left side panel, if necessary.

(2) Disconnect battery cable (fig. 4-19) from alternator. Disconnect polarity protector wire from other alternator terminal.

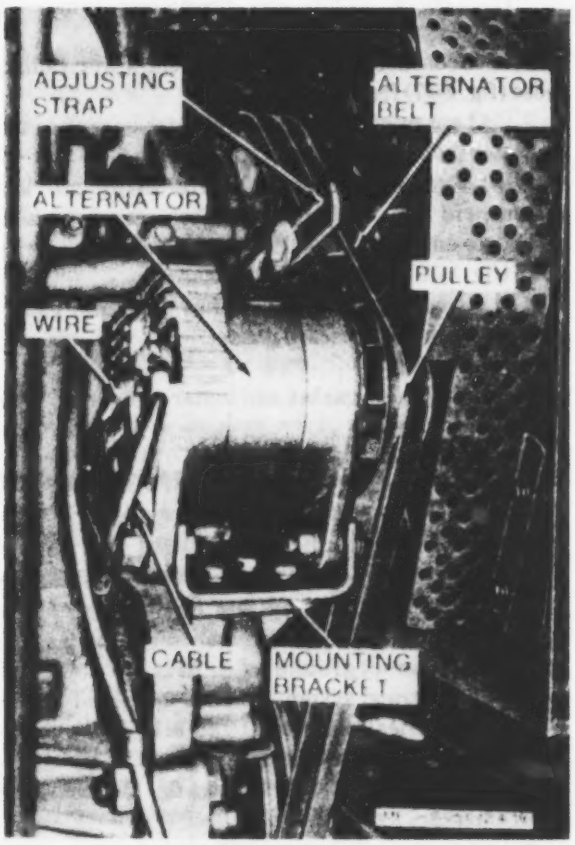


Figure 4-19. Alternator, removal and installation

(3) Remove screw and washer securing alternator to adjusting strap (fig. 4-19).

(4) Remove two screws, washers and nuts securing alternator to mounting bracket. Slide belts from pulley and remove alternator from engine.

(5) Place alternator in a soft-jawed vise. Remove self-locking nut and washer securing pulley to shaft. Tap alternator shaft sharply with a mallet to loosen and remove pulley. Remove fan and key from shaft.

c. Installation.

(1) Slide fan on shaft with key alined in slot.

(2) Install pulley on shaft and secure with washer and self-locking nut. Tighten nut to a torque of 60 to 80 foot-pounds.

WARNING

Place master switch in off position and disconnect battery cables.

(3) Install alternator (fig. 4-19) on bracket and install screws, washers and nuts. Do not tighten.

(4) Install belts in pulley. Move alternator to aline slot in adjusting brace with hole in alternator flange. Install screw and washers.

(5) Adjust belt tension (para 4-26) and tighten mounting and adjusting screws.

d. Testing. To test the alternator a direct current voltmeter with a 0-40 scale is required.

(1) Open engine left side panel, if necessary.

(2) Connect the test leads of the voltmeter to the alternator as shown in figure 4-20.

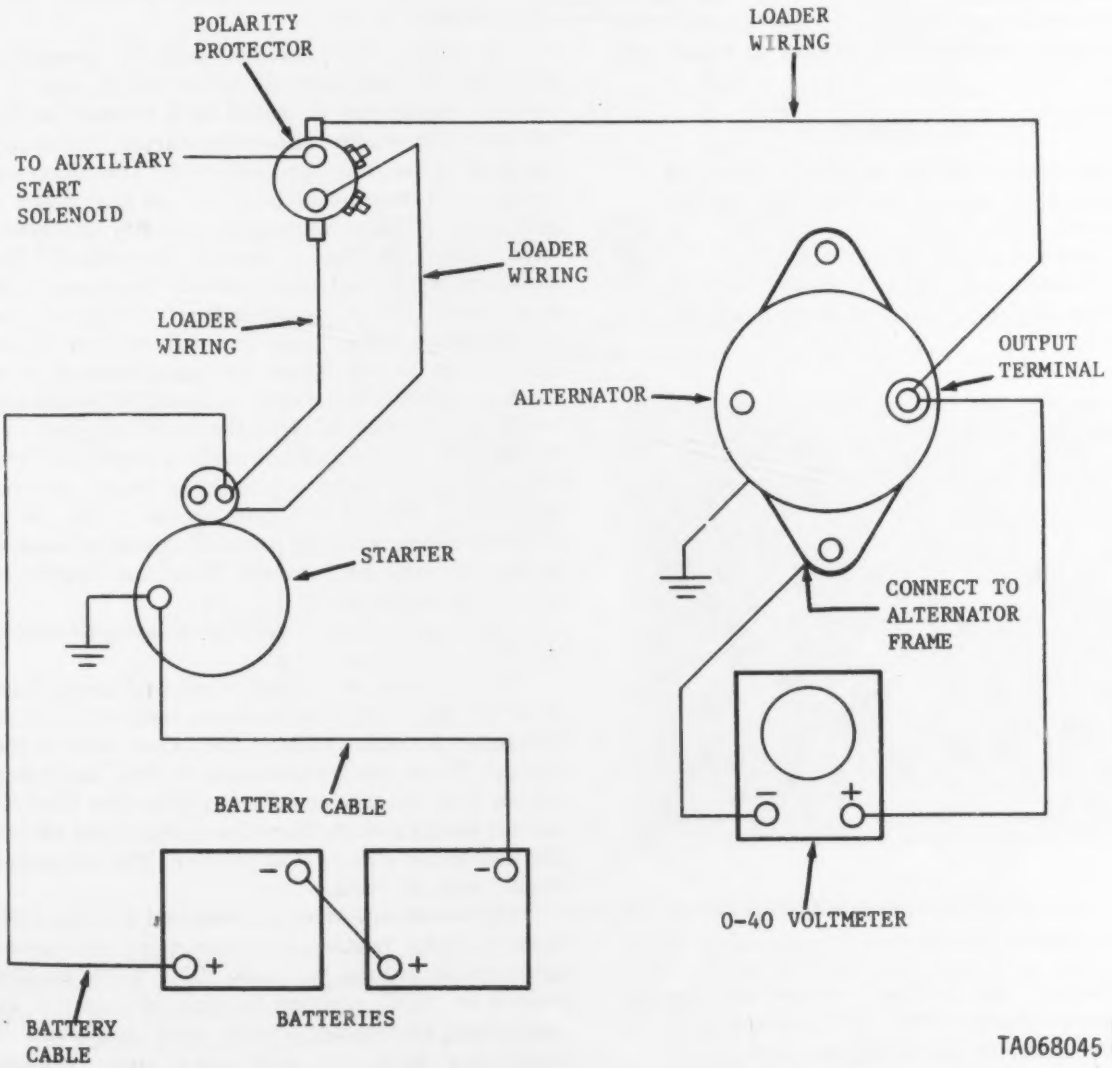


Figure 4-20. Alternator test hookup

(3) Start engine (fig. 2-6) and allow to reach operating temperature.

(4) Check voltage as indicated on voltmeter (fig. 4-20). Readings shown below indicate condition of alternator or system.

(a) If the system voltage is normal (26.4 to 30.0 volts) or lower, the alternator is operating properly.

(b) If voltage is lower than normal, check condition of batteries and loader wiring and correct.

(c) If system voltage is high (over 30 volts), replace the alternator.

4-34. Starter

a. General. The starter, mounted on the left side of the engine, is an over-running clutch type. A solenoid-operated lever pivots to move the clutch drive gear into engagement with the flywheel. The solenoid also completes the circuit to rotate the starter.

b. Removal.

WARNING

Place master switch in off position and disconnect battery cables. Disconnect ground cable first.

(1) Remove engine left side panel.

(2) Remove nut and lock washer and disconnect cables (fig. 4-21) and lead wires from solenoid switch.

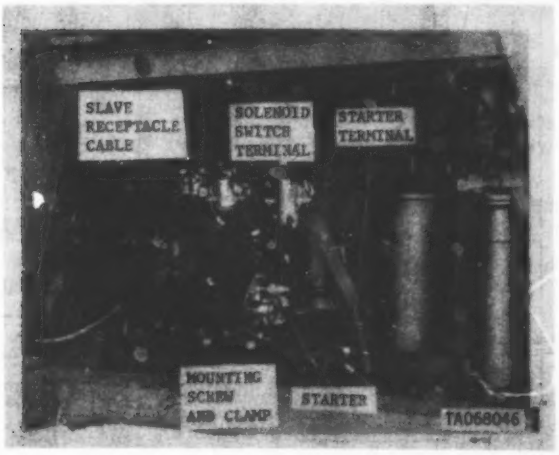


Figure 4-21. Starter, removal and installation

(3) Remove nut and lock washer and disconnect battery cable (fig. 4-21), slave receptable cable, and ground cable from starter terminal.

(4) Remove three screws (fig. 4-21) and lock washers. Move slave receptacle cable (fig. 4-21) and clamp away from starter. Remove starter from loader.

c. Installation.

WARNING

Place master switch in off position and disconnect battery cables.

(1) Install the starter (fig. 4-21) in position on flywheel housing. Secure starter and cable clamp to housing with three screws and lock washers.

(2) Connect cables (fig. 4-21) and leads to starter solenoid switch and secure with nut and lock washer.

(3) Connect battery cable (fig. 4-21), slave receptacle cable and ground cable to starter terminal and secure with nut and lock washer.

4-35. Polarity Protector and Auxiliary Solenoid

a. General. The reverse polarity protector, auxiliary starter solenoid switch, diode, and the circuit breaker are mounted on a bracket on the left side of the engine above the starter. The circuit breaker is the main protection for the electrical system. Polarity protection for the alternator is provided by the dual-purpose polarity protector, which also acts as a starter disconnect. The auxiliary starter solenoid controls the starter and is actuated by the neutral start switch on the transmission linkage and the start button on the instrument panel. When the transmission is in neutral position, the switch is closed, allowing the auxiliary solenoid to close the starting circuit to the starter when the start button is depressed. The diode prevents engine cranking when reverse polarity is present. To gain access to the units remove engine left side panel. The entire bracket assembly must be removed from the engine to remove components.

b. Polarity Protector Test. Test polarity protector as follows before removal.

(1) Tag and disconnect electrical leads from post "A" (fig. 4-23). Connect one lead of a 0-50 dc voltmeter to post "A" and the other lead to the chassis. Place the transmission control lever (fig. 2-4) in the neutral position to close the neutral starter safety switch. Turn the master light switch (fig. 2-3) to the unlock (on) position. The voltmeter should read 24 volts.

(2) Disconnect wires 119, 932 and 934 (fig. 4-22) from polarity protector. Connect an ohmmeter between terminals "C" and "D". Turn master switch to "ON" position (engine should not be operating). Ohmmeter should read zero ohms. If ohmmeter does not read zero ohms replace polarity protector. Turn master switch off and connect wires to terminals.

c. Removal.

WARNING

Place master switch in off position and disconnect battery cables. Disconnect ground cable first.

(1) Disconnect wires from bottom posts of polarity protector (fig. 4-23). Tag wires.

(2) Disconnect cables and wires from terminals on both sides and front of polarity protector. Tag wires.

(3) Disconnect wires form auxiliary solenoid switch (fig. 4-23). Tag wires.

(4) Disconnect wires from main circuit breaker (fig. 4-23). Tag wires.

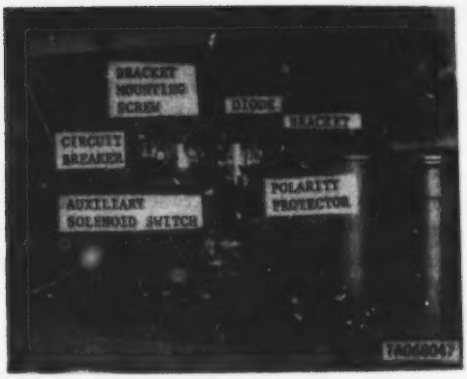


Figure 4-22. Polarity protector test

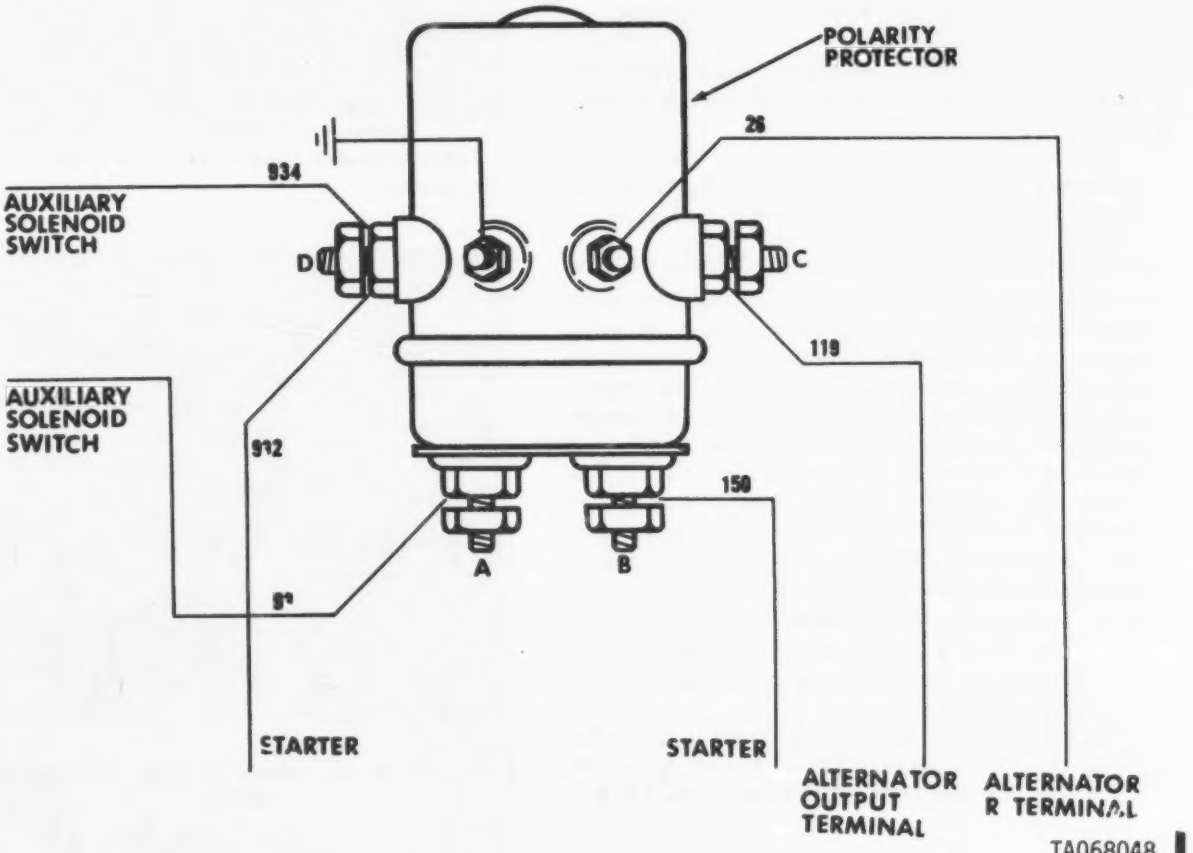


Figure 4-23. Polarity protector, solenoid switch and circuit breaker, removal and installation

(5) Remove two screws (fig. 4-23) and lock washers securing bracket to engine block. Remove bracket and components from engine.

(6) Remove polarity protector by removing two screws, nuts and lock washers securing protector to bracket. Remove protector from bracket.

(7) Remove auxiliary solenoid switch by removing two screws, nuts and lock washers securing switch to bracket. Remove switch from bracket.

NOTE

Diode (fig. 4-22) is press fit into the bracket. Press diode from bracket if replacement is necessary.

(8) Test diode by placing positive probe of an ohmmeter on electrical lead from diode to auxiliary solenoid, and the negative probe on the other end of diode. Ohmmeter should read near zero. Reverse ohmmeter probes. Ohmmeter should read a high resistance. If diode does not test as indicated, replace diode. Diode must block reverse flow of current to prevent reversing polarity of alternator.

(9) Remove the machine screws, nuts and lock washers securing main circuit breaker to bracket. Remove breaker from bracket.

d. Installation.

(1) Install polarity protector (fig. 4-23), auxiliary solenoid switch and main circuit breaker on bracket in reverse orderof removal.

NOTE

If diode (fig. 4-22) was removed, press new diode into recess in bracket. Use care so as not to damage diode.

(2) Install bracket, with attached components, on engine as shown in figure 4-22. Secure bracket with two screws and lock washers.

(3) Connect wires and cables to polarity protector, auxiliary solenoid and main circuit breaker. Refer to tags for correct installation.

4-36. Transmitters, Gages, and Instruments

a. General. Transmitters are actuated by pressure or temperature to operate gages or warning lights on the instrument panel. There are four transmitters installed on the loader. The engine temperature transmitter is mounted on the water manifold. Engine oil pressure transmitter is mounted in the engine below the alternator. The converter oil temperature and temperature warning transmitters are mounted on the converter. Observe the following before attempting to remove the transmitters.

WARNING

Place master switch in off position and disconnect battery cables. Disconnect ground cable first.

b. Test. If any of the gages or warning lights fail to operate or fluctuate or flicker during operation, check the transmitters. Start engine and allow to reach operating temperature. Observe operation of gages and lights. If gages and lights do not operate properly, check connections. If connections are secure, test transmitters. Disconnect wire from transmitter. Touch negative probe of a voltmeter to transmitter wire and positive probe to transmitter. Voltmeter should read 22 to 24 volts and be steady. An incorrect voltage reading would indicate a defective transmitter or open circuit in the gage or in the wire from the gage to the transmitter.

NOTE

Converter temperature warning transmitter should show no voltage reading. If voltmeter indicates voltage when converter temperature gage is in green zone, replace transmitter.

c. Engine Coolant Temperature Transmitter

(1) Remove engine right side panel.

(2) Disconnect wire from engine coolant temperature transmitter (fig. 4-24).

(3) Remove transmitter from water manifold.

(4) Install new transmitter and connect wire to transmitter.

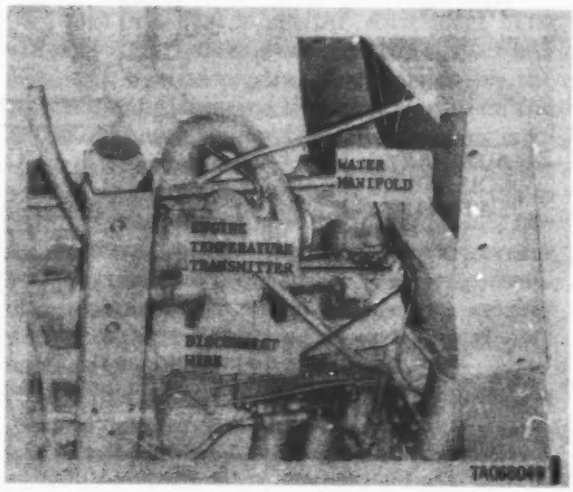


Figure 4-24. Engine temperature transmitter, removal and installation

d. Engine Oil Pressure Transmitter

(1) Remove engine left side panel, if necessary.

(2) Disconnect wire from engine oil pressure transmitter (fig. 4-25).

(3) Remove transmitter from engine.

(4) Install new transmitter and connect wire to transmitter.

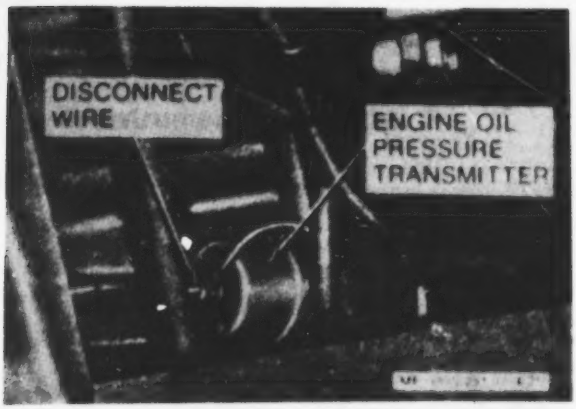


Figure 4-25. Engine oil pressure transmitter, removal and installation

e. Converter Oil Temperature Transmitters.

(1) Operate loader and swing front end as far as it will go to the left to allow access to right side of transmission.

(2) Disconnect wires from transmitters (fig. 4-26).

(3) Remove transmitters from tee and converter housing.

(4) Install new transmitters and connect wires.

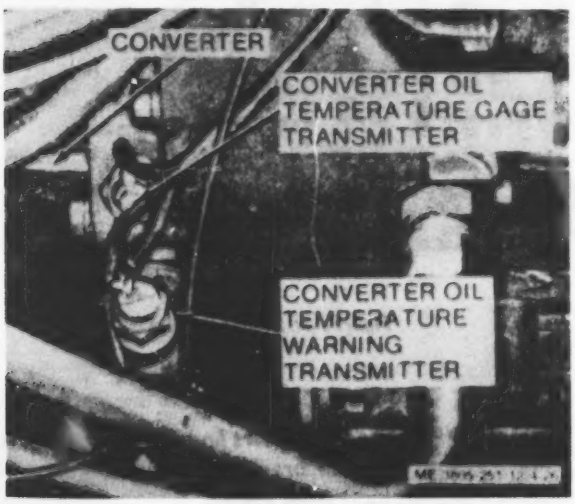


Figure 4-26. Converter oil temperature transmitters, removal and installation.

f. Gages and Switches.

(1) *General.* The main gages and instruments are installed in the instrument panel mounted in front of the driver.

(2) *Removal.*

***Warning:* Turn master switch to off position and disconnect battery cables.**

(a) Remove outer screws from panel section and swing panel section forward.

(b) Tag and disconnect wiring from back of gage or instrument.

(c) Disconnect any tubes, hoses or cable connected to back of gage. Cap tubes and hoses.

(d) Remove screws and washers securing gage to panel and remove gage.

(e) Disconnect wires from switches. Remove attaching nuts and remove switches from front of panel.

(3) *Installation.* Install gages and switches in reverse order of removal.

4-37. Exterior Lights

a. General. The loader exterior lights consist of floodlights on each side of the vehicle mounted inside of a protective guard with turn signal lights, and on the right side a blackout head light. An additional floodlight and the front headlight are mounted inside a guard at the center front of the loader. Rear lights, mounted in guards on each side of the grille, consist of two floodlights, two tail, turn signal and parking lights, and two blackout tail lights. Before performing any maintenance on the lights observe the following.

***Warning:* Place master switch in off position and disconnect battery cables. Disconnect ground cable first.**

b. Headlights and Floodlights. The headlights and floodlights are identical in construction. Removal of the lights and replacement of the lamp units is the same for both.

(1) *Removal.*

(a) Disconnect wires (fig. 4-27) from harness.

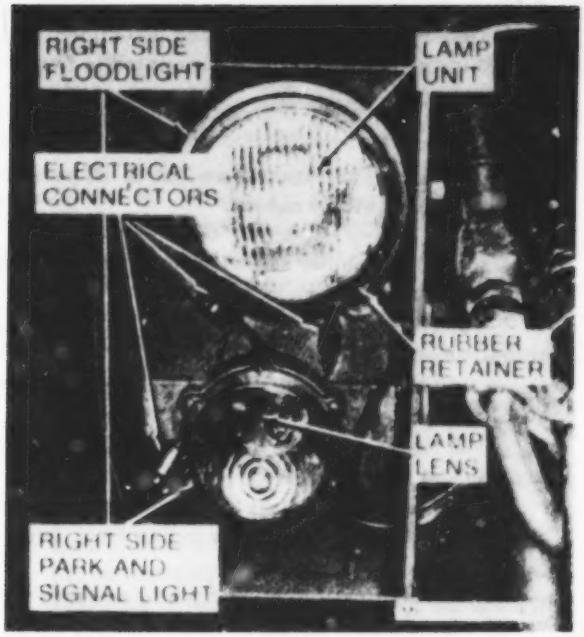


Figure 4-27. Loader front lights

(b) Remove nut (fig. 4-26) and lock washer securing light to guard. Remove light assembly from loader.

(2) *Installation.* Install floodlight or headlight in reverse order of removal.

(3) *Lamp unit replacement.* Remove rubber retainer (fig. 4-26) by rolling it back from lamp unit. Disconnect wires from lamp unit. Install new lamp unit and connect wires to lamp unit. Secure lamp unit by rolling rubber retainer over raised flange on lamp unit.

c. Park and Signal Lights.

(1) *Removal.*

(a) Disconnect wires (fig. 4-27) from harness.

(b) Remove two screws and lock washers securing park and signal lights to bracket. Remove light assembly from loader.

(2) *Installation.* Install park and signal lights in reverse order of removal.

(3) *Lamp replacement.* Remove six screws securing lamp lens (fig. 4-27) to frame. Remove defective lamp by pressing in and turning one-quarter turn counterclockwise. Install new lamp by sliding prongs in slots and turning one-quarter turn clockwise.

d. Blackout Headlight

(1) *Removal*

(a) Disconnect wires from blackout headlight mounted on left front of loader.

(b) Remove nut, lock washer and beveled washer securing blackout headlight to bracket and remove blackout headlight from loader.

(2) *Installation.* Install blackout headlight i reverse order of removal.

(3) *Lamp replacement.* Remove three screw securing door assembly to body assembly and remov door assembly. Remove three springs and disconnec lamp unit from connector at rear of body. Remov lamp unit. Install new lamp unit and connect to con nector at rear of body. Install springs and door assem bly over lamp unit and secure with three screws.

e. Rear Floodlights. The rear floodlights are replaced in the same manner as described in *b* (1) above.

f. Rear Blackout Lights.

(1) *Removal.*

(a) Disconnect wiring from rear blackout light (fig. 4-28).

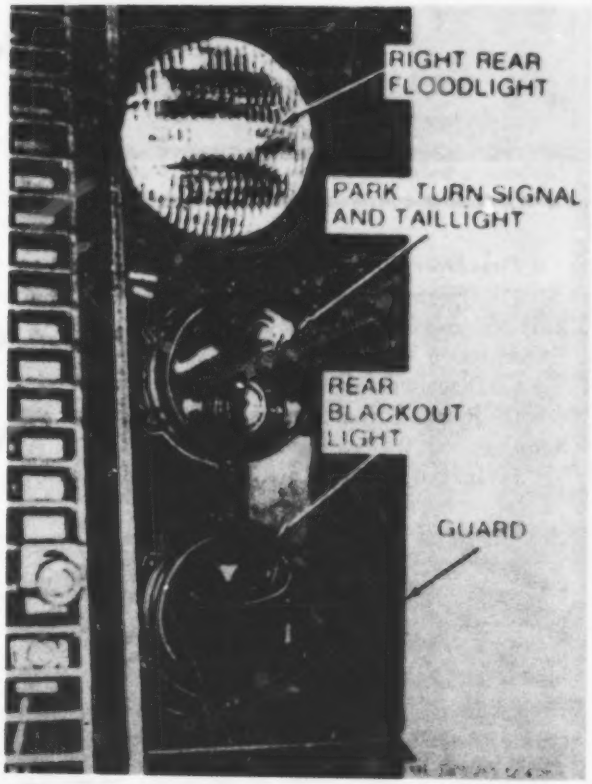


Figure 4-28. Loader rear lights

(b) Remove two screws and lock washers securing blackout light to bracket at rear of guard. Remove blackout light from loader.

(2) *Installation.* Install rear blackout light in reverse order of removal.

(3) *Lamp replacement.* Remove six screws securing assembly to body. Remove door assembly and gasket. Press in on lamp and turn one-quarter turn

counterclockwise and remove defective lamp. Install prongs on new lamp in slots, press lamp in and turn one-quarter turn clockwise to secure. Install door assembly and gasket and secure with six screws.

g. Rear Floodlights. Removal and replacement of lamp unit for the rear floodlights (fig. 4-28) is identical to the front headlights and floodlights (*b* above).

h. Park, Turn Signal and Taillights. The park, turn signal and taillight (fig. 4-28) is removed and repaired in the same manner as the front signal lights (*c* above).

4-38. Instrument Panel Lights

a. General. Lights on the instrument panel consist of four lights to illuminate the panel for night operation, an ignition indicator light, and a low air pressure warning light.

b. Lamp Replacement

(1) *Panel lights.* Remove light from instrument panel by pushing sideways on light hood. Slide light hood from socket. Remove lamp from socket. Install new lamp in socket and install hood on socket. Press light into instrument panel.

(2) *Low air pressure warning light and ignition indicator light.* Unscrew lens from socket and remove lamp from socket. Install new lamp in socket and enclose with lens.

4-39. Horn

a. General. The horn is air-operated. When the horn button is depressed, a solenoid valve opens, allowing air to pass through and operate horn. The horn is mounted on the left hand chassis side plate.

b. Removal

Warning: **Place master switch in the off position. Disconnect battery cables. Disconnect ground cable first.**

(1) Disconnect air line (fig. 4-29) from horn and remove elbow.

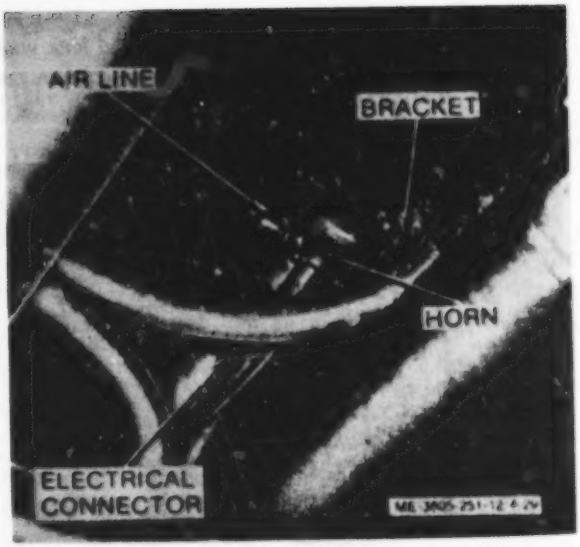


Figure 4-29. Horn, removal and installation

(2) Disconnect electrical leads from horn.

(3) Remove two screws, lock washers and nuts securing horn to bracket. Remove horn from loader.

c. Installation. Install horn in reverse order of removal.

4-40. Turn Signal and Emergency Flasher

a. General. The turn signal lever (fig. 2-4) operates the turn signal lights and emergency flashing of the lights. Intermittent on-off flashing of the lights is actuated by a flasher unit mounted in the top of the hydraulic reservoir compartment at the front of the vehicle.

b. Removal

Warning: **Place master switch in off position. Disconnect battery cables. Disconnect ground cable first.**

(1) Remove four screws, washers and lock washers securing front access cover. Remove access cover.

(2) Disconnect wires from flasher unit (fig. 4-30).

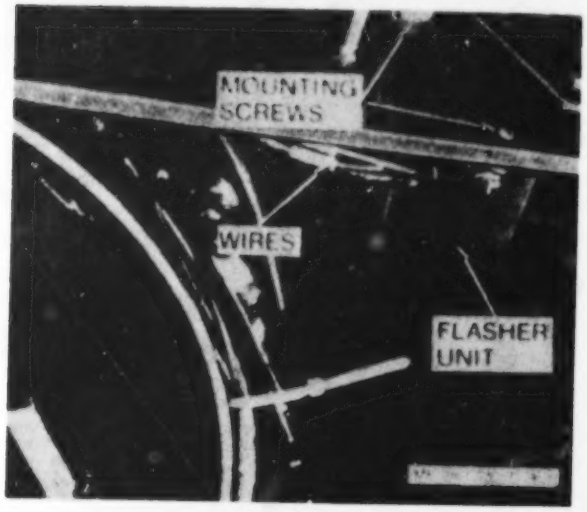


Figure 4-30. Turn signal flasher, removal and installation

(3) Remove two screws, lock washers and nuts securing the flasher unit to the front frame. Remove flasher unit from loader.

c. Installation. Install the flasher unit in reverse order of removal.

4-41. Slave Receptacle

a. General. The slave receptacle, mounted on the left front of the engine compartment is used to start the engine from an auxiliary source or supply power to the loader from such a source.

***Warning:* Place the master switch in the off position. Disconnect battery cables. Disconnect ground cable first.**

b. Removal

(1) Disconnect receptacle cables from starter terminal (fig. 4-21) and starter solenoid terminal.

(2) Remove four screws securing slave receptacle (fig. 4-31) to frame. Remove receptacle from loader.

Figure 4-31. Slave receptacle, removal and installation

c. Installation. Install slave receptacle in reverse order of removal.

4-42. Hourmeter

a. General. The hourmeter registers elapsed operating time of the loader engine. Electrical actuation of the loader is received from the alternator and polarity protector. The hourmeter is mounted on the front of the engine compartment at the rear of the operator's compartment.

b. Removal

***Warning:* Place master switch in off position. Disconnect battery cables. Disconnect ground cable first.**

(1) Open engine right side panel.

(2) Disconnect two wires from rear of hourmeter (fig. 4-32).

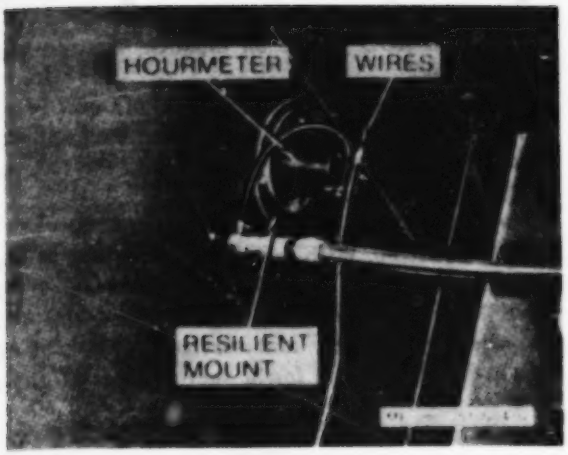


Figure 4-32. Hourmeter, removal and installation

(3) Remove three screws securing hourmeter and resilient mount (fig. 4-32) to frame. Remove resilient mount and hourmeter from loader. Remove hourmeter from resilient mount.

c. Inspection and Repair. Inspect resilient mount for breaks, hardness and deterioration. Replace mount if defective.

d. Installation. Install hourmeter in reverse order of removal.

4-43. Wiring and Wiring Harness

a. General. The loader wiring harness is divided into two major harnesses, front and rear. Two large multiple connectors join the harnesses near the center of the loader.

***Warning:* Place master switch in the off position. Disconnect battery cables. Disconnect ground cables first.**

b. Repair

(1) Repair broken, frayed, or cracked insulation with electrical tape.

(2) Resolder, crimp or replace broken terminals.

(3) Repair shorted connections.

(4) Replace broken wires and connections.

(5) Clean corroded terminals with abrasive cloth or replace if necessary.

Section XIII. MAINTENANCE OF THE TRANSMISSION

4-44. Transmission Assembly

a. General. The transmission consists of a torque converter, planetary gear set, reverse gear set, and a drive clutch. Drive shafts extend from the front and rear of the housing and connect to the axle differentials. The transmission is capable of four forward and two reverse speeds.

b. Inspection. Inspect the transmission for loose bolts, oil leaks, linkage defects, and bent or damaged oil lines. Clean the transmission housing and linkage periodically. Lubricate the linkage.

4-45. Transmission Service

a. Checking Oil Level with Plugs.

(1) *Cold check.*

(a) Two oil level check plugs are located at the lower right front of the transmission housing (fig. 4-33). Before starting the engine, remove the upper plug. If oil flows from the plug opening, there is sufficient oil to permit starting the engine. If little or no oil flow is present, add oil until oil flows from the opening.

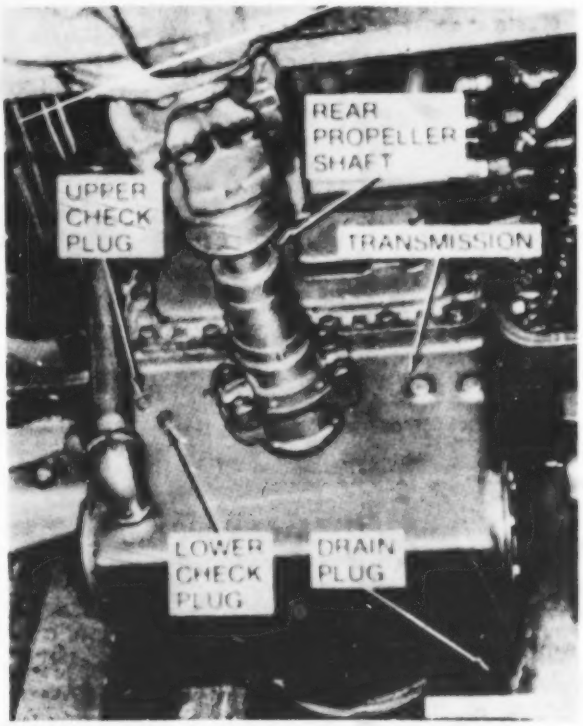


Figure 4-33. Transmission level plugs

(b) Start the engine and operate at idle to half throttle with the transmission in neutral. Operate for approximately 1 minute to charge the hydraulic system.

(c) With the engine running, add oil as necessary to bring the level to the lower check plug.

Note. An oil check made at lower engine rpm may result in low level at operating speeds. Thermal expansion will raise the oil level when the transmission oil reaches operating temperature.

(d) Perform the hot oil check.

(2) *Hot check.* Start the engine and run at idle to half throttle until the transmission reaches normal operating temperature (approximately 180° F. Idle the engine and slowly shift through all range positions to ensure that all parts of the system are filled with oil. Shift to neutral and operate the engine at idle or half throttle. Remove the upper oil level check plug. Add oil as necessary to bring the level to the plug opening.

Note. Foaming or spurting may indicate a false oil level. A true level is indicated by a steady trickle of oil flowing from the check plug hole. The transmission may be operated safely as long as the oil is above the level of the lower check plug.

b. Dipstick Oil Check. The transmission oil level dipstick and filler cap (fig. 4-34) is located on the left side of the transmission.

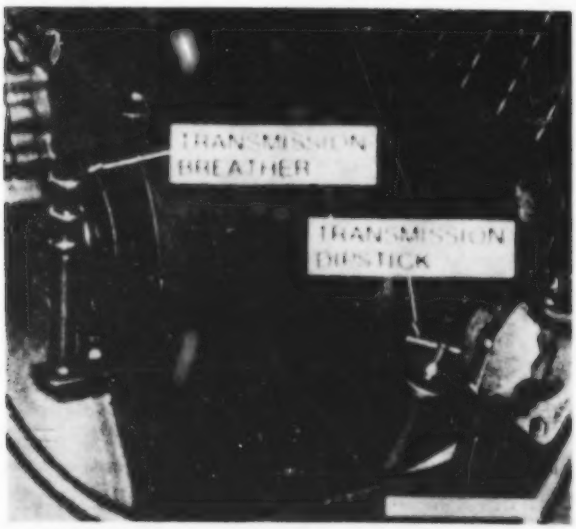


Figure 4-34. Transmission dipstick and breather.

(1) Start engine (fig. 2-6), leave transmission in neutral and allow to run until transmission is at operating temperature.

(2) Operate engine at idle speed. Remove dipstick and check oil level. Level should be between FULL and ADD marks on dipstick, but not above FULL mark.

(3) Keep engine operating and add oil (refer to LO 5-3805-251-12 for correct grade) if oil level is below add mark. A quart of oil will raise level approximately one-half inch.

c. Changing Oil.

(1) *Draining.* With the transmission at operating temperature (180° F), remove the drain plug at the lower left rear of the transmission housing (fig. 4-32). Remove the oil filter and service the oil strainer. Allow the oil to drain for 30 minutes. Install the oil strainer and a new filter element.

(2) *Refilling.* Install the drain plug and add 4 quarts of transmission fluid according to the Lubrication Order. Perform the hot check and add oil as necessary.

d. Transmission Oil Filter Service.

(1) *Removal*

(a) Disconnect the oil lines to the transmission oil filter (fig. 4-34). Cap or plug openings.

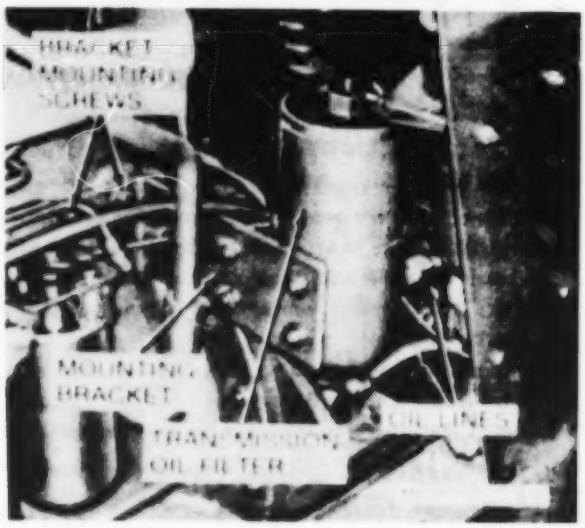


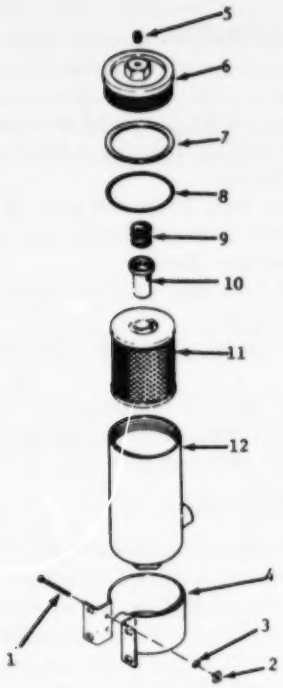
Figure 4-35. Transmission oil filter, installed view.

(b) Remove four screws, nuts and lock washers securing the filter mounting bracket to the engine. Remove the filter and bracket as an assembly.

(c) Remove two screws (1, fig. 4-35), nuts (2) and lock washers (3) securing the filter to the mounting bracket (4). Remove the mounting bracket.

(2) *Service.* The filter does not have to be removed for service operations.

(a) Remove the pipe plug (5) and unscrew the end cap (6). Remove backup ring (7), preformed packing (8), spring (9), relief valve (10) and filter element (11) from housing (12).



1 Screw
2 Nut
3 Lock washer
4 Mounting bracket
5 Pipe plug
6 End cap
7 Backup ring
8 Preformed packing
9 Spring
10 Relief valve
11 Filter element
12 Housing

TA068050

Figure 4-36. Transmission oil filter, exploded view

(b) Clean all components in solvent and wipe dry.

(c) Install a new element (11) and assemble the filter. Tighten the end cap (6) to 20 to 35 foot-pounds.

(3) *Installation.*

(a) Install the filter assembly (fig. 4-35) and mounting bracket on the engine bracket screws. Secure with four lock washers and nuts.

(b) Connect oil lines to filter.

(c) Check transmission oil level and add as necessary.

e. Strainer Service.

(1) Start the engine and allow to run until the transmission temperature gage reads approximately 180° F. Stop the engine.

(2) Remove the drain plug (fig. 4-33) and allow the oil to drain from the transmission.

(3) Service the transmission oil filter.

(4) Remove six screws and lock washers (fig. 4-37) securing the strainer to the transmission housing. Remove strainer. Discard the gasket.

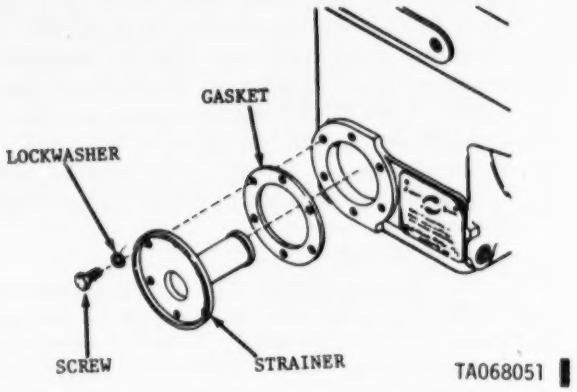


Figure 4-37. Transmission strainer service

(5) Clean the strainer in solvent and dry with compressed air.

(6) Install the strainer and new gasket on the transmission housing. Check that the inside end of the strainer slips over the end of the oil pickup tube in the sump.

(7) Fill the transmission with oil.

f. Breather Service. Clean the area around the breather (fig. 4-34) and remove from transmission housing. Clean the breather by agitating in mineral spirits or solvent. Dry thoroughly with compressed air before installing. Always use a wrench of the proper size to remove or install the breather.

g. Hose, Lines, and Fittings Replacement.

(1) Remove the drain plug (fig. 4-33) and allow oil to drain from the transmission.

(2) Clean all oil lines and fittings before removal. If several lines are to be replaced, tag lines to ensure proper installation.

(3) Disconnect clamps or attaching hardware and remove line which is to be replaced.

(4) Install a new line by reversing the removal procedure.

Section XIV. MAINTENANCE OF BRAKES

4-46. Parking Brake

a. General. The parking brake holds the loader in position while parked and also acts as an emergency brake. The loader cannot be moved until at least 63 psi has been built up in the air system. This air pressure, acting in the brake actuator, overcomes the spring pressure and releases the parking brake. The brake is mounted on the front of the transmission and the brake actuator is operated by a valve mounted on the instrument panel. When the valve lever is pulled out the air is exhausted, allowing the springs to set the brake.

b. Adjustment.

(1) Operate engine to build up air pressure.

(2) Pull lever on brake valve to set parking brake. Place transmission in forward gear and try to move loader. Loader should not move. If slight movement indicates parking brake is not holding properly, adjust linkage.

(3) Remove cotter pin and remove clevis pin connecting actuator rod to link (fig. 4-38) attached to parking brake lever.

Figure 4-38. Parking brake linkage

(4) Loosen nut above clevis (fig. 4-38) and screw clevis on rod to shorten length of rod. Screw clevis only a few turns at a time. Install clevis pin and cotter pin.

(5) Check operation of parking brake ((2) above) and adjust to provide positive holding by brake.

c. Removal.

(1) Remove cotter pins and remove clevis pins (fig. 4-38) connecting link (fig. 4-38) to actuator rod and parking brake.

(2) Remove link from rod and parking brake. Remove nut and remove clevis from actuator rod.

d. Inspection and Repair

(1) Inspect link (fig. 4-38) and clevis for cracks and bent condition.

(2) Inspect clevis pins (fig. 4-38) for wear and damage.

(3) Replace unserviceable parts.

e. Installation. Install link (fig. 4-38) and clevis pins in reverse order of removal.

4-47. Service Brakes

a. General. Each wheel is equipped with a service brake. The brakes are actuated by an air-over-hydraulic cylinder. Hydraulic wheel cylinders in each wheel provide the force to apply the brakes. The brakes are retracted from the drums through the action of return springs. Air to operate the brake master cylinders is applied through the brake treadle valve.

b. Adjustment

(1) If brakes do not seem to be operating properly, check brake master cylinder. Length of rod (fig. 4-39) extension from air chamber should be less than one inch as shown. If rod extends one to one and one-quarter inches, adjust brakes as follows.

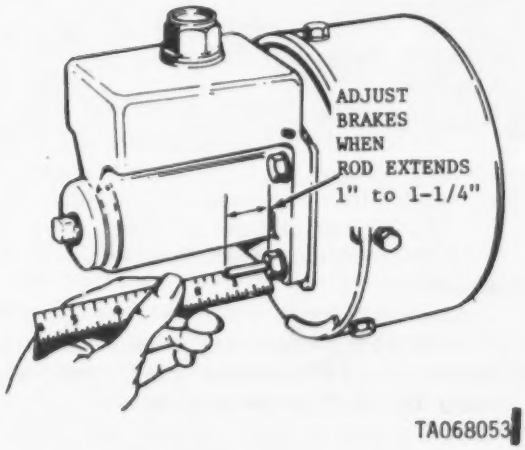


Figure 4-39. Checking brake adjustment

(2) Place jack under axle or frame and raise wheel requiring adjustment far enough to allow rotation. Place transmission in neutral position.

(3) Remove rubber plug (fig. 4-40). Turn the star heel, using a brake adjusting tool or screwdriver until brake lining drags on drum when wheel is rotated by hand.

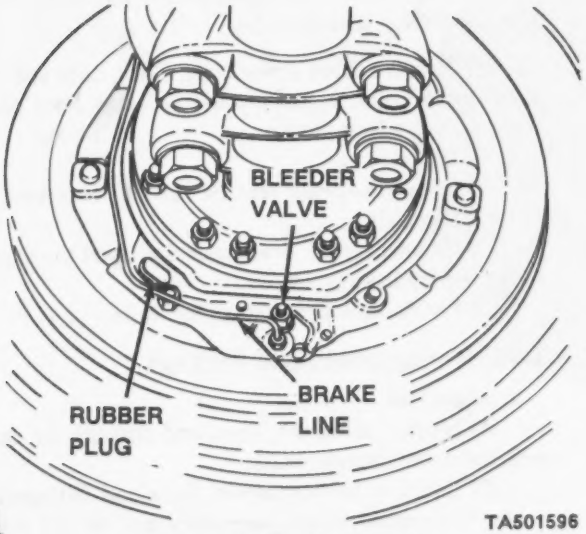


Figure 4-40. Wheel brake service

(4) Remove rubber plug on top of wheel and repeat adjustment on other shoe. Alternately turn both star wheels until drum cannot be rotated.

(5) Back off star wheels until only a slight drag is noticed when wheel is rotated.

(6) Adjust brakes on all four wheels as described above.

(7) Check brake adjustment by operating loader. Repeat adjustment if necessary. If stroke indicator fails to meet 1¼ inch requirement, brake lining is worn and must be replaced. Notify direct support maintenance.

Note: Bleed brake cylinders farthest from master cylinder first. When bleeding front or rear brake systems always bleed the right front or rear wheel cylinder first.

(1) Remove filler cap on master cylinder (fig. 4-42) and fill to proper level (3/8 to 1/2 inch from top).

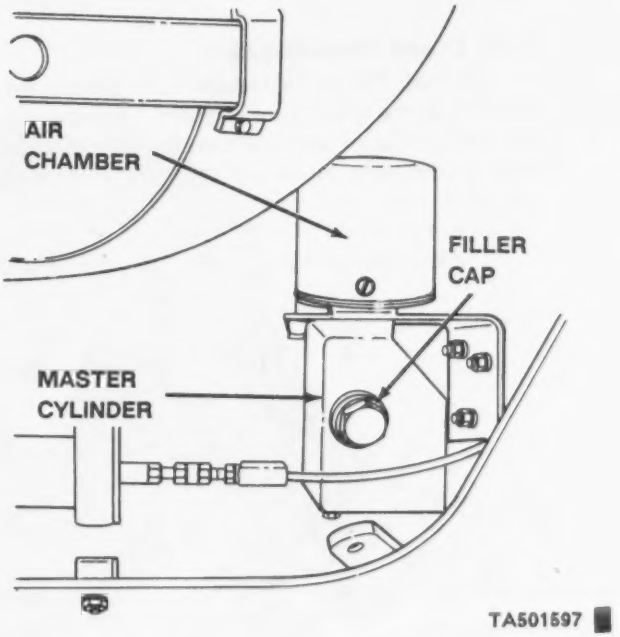


Figure 4-41 Brake cylinder cluster

(2) Connect a bleeder hose to bleeder valve (fig. 4-40). Submerge other end of hose in a glass jar partially filled with brake fluid. Open bleed valve one turn.

Caution: **While pumping brake treadle, keep end of hose submerged in fluid to prevent entrance of air into system.**

(3) Operate engine loader to build up air pressure. Slowly depress brake treadle to end of travel and release treadle. Observe hose in jar and repeat pumping of brake treadle until no air bubbles escape hose. Hold treadle at bottom of travel and close bleed valve to keep additional air from entering system.

Note: While pumping treadle, check fluid level in master cylinder. Add fluid to keep cylinder as close to full as possible at all times during bleeding process.

(4) Repeat bleeding operation on other wheel affected.

(5) Fill master cylinder to proper level after bleeding operation.

Caution: **Discard fluid salvaged from brake system during bleeding operation. Do not use in system.**

4-48. Brake Treadle Valve

a. General. The brake treadle valve directs the air pressure to the brake air chambers. The air pressure actuates the piston and operates the master cylinder forcing hydraulic oil under pressure to the wheel cylinders.

b. Removal

(1) Block vehicle wheels and apply parking brake.

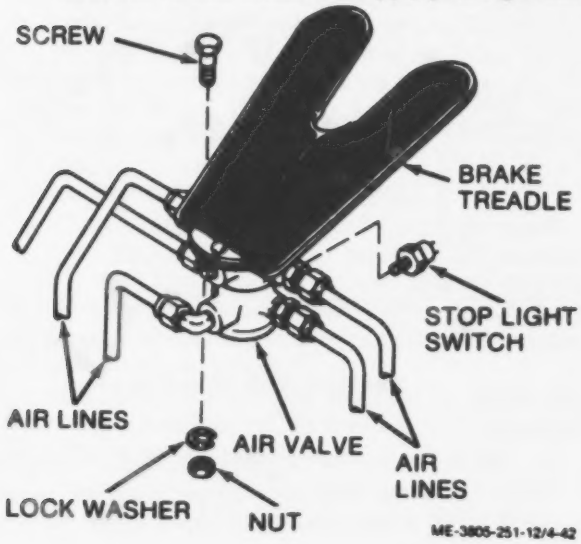


Figure 4-42. Brake treadle valve

(2) Open drain cock on air reservoir to exha air from system.

(3) Clean treadle valve and surrounding are remove dirt and grease.

(4) Disconnect five air lines (fig. 4-42) from valve. Cap or plug valve ports to prevent entry dirt.

(5) Disconnect wires and remove stop light swi (fig. 4-42) from treadle valve.

(6) Remove three screws (fig. 4-42), nuts and lo washers securing brake treadle valve to floor pla Remove valve from loader.

c. Installation

(1) Install the brake treadle valve by reversing t removal procedure.

(2) Close reservoir drain cock and start the engi to pressurize the system.

(3) Check lines and fittings for leaks.

4-49. Hoses, Lines and Fittings

a. Inspection

(1) Inspect all hoses, lines and fittings for dam age, leaks and deterioration.

(2) Check to be sure hoses, lines and fittings a securely clamped where necessary and do not inte fere with articulation of loader.

b. Replacement. Replace all defective hoses, lines o fittings. Tighten connections if necessary.

Section XV. MAINTENANCE OF WHEELS AND TIRES

4-50. General

The four wheels of the loader are mounted to the wheel hubs encircling the planetary gears on each axle. The tires are all-directional tread and are inflated to a pressure of 35 psi.

4-51. Tires and Wheels

a. Removal

(1) Park the loader on firm level surface with the bucket resting on the ground. Install safety link (fig. 2-1) between front and rear sections. Engage parkin brake and block wheels not being removed.

(2) Place a suitable jack under axle where axl joins the trunnion. Raise loader to bring tire at lea 3 to 5 inches off the ground.

(3) Remove 10 wheel nuts (fig. 3-13) securin wheel to wheel hub. Use a suitable hoist and remov wheel and tire from axle.

(4) Remove cap (fig. 4-43) from wheel and deflat tire. Remove adapter and valve from wheel.

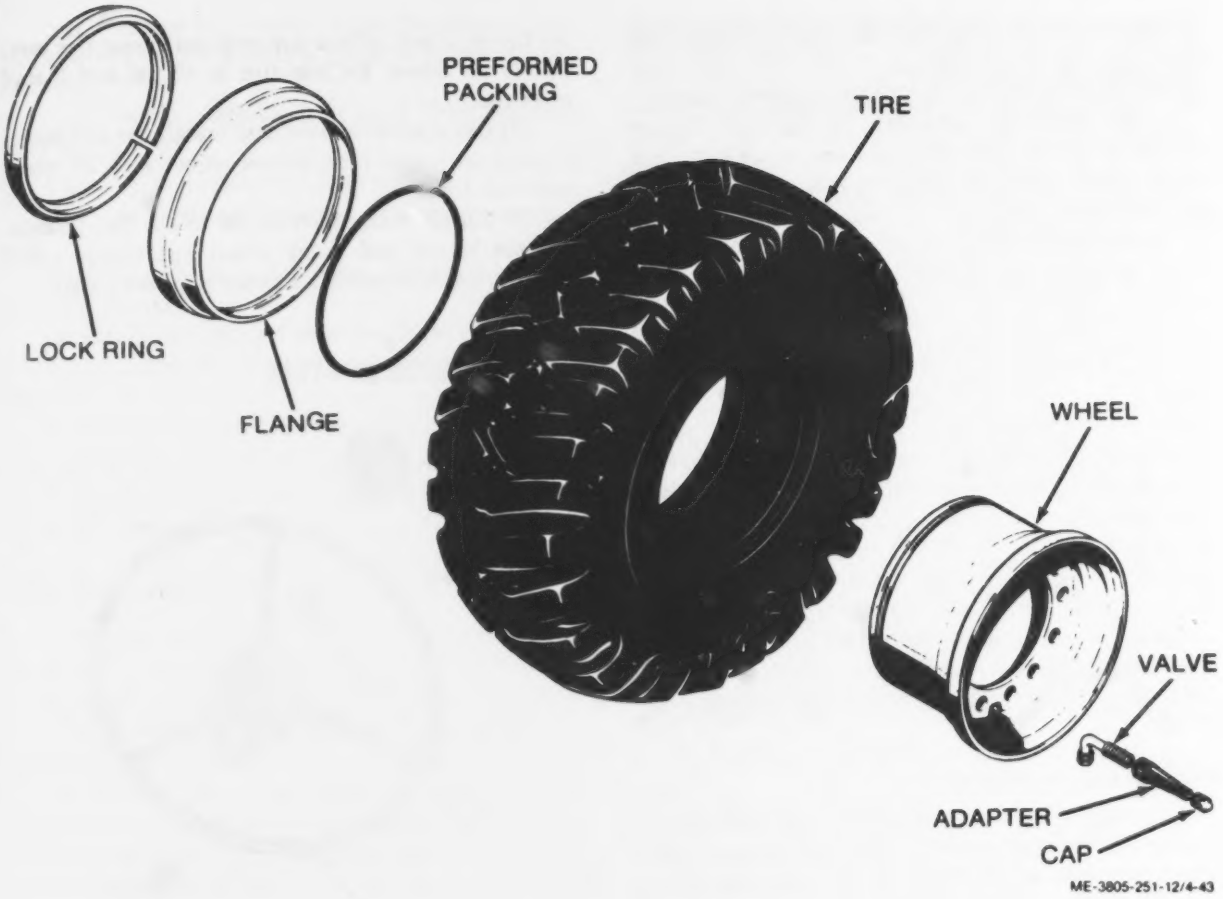


Figure 4-43. Wheels and tire, exploded view

(5) Lay tire and wheel on suitable supports with lock ring (fig. 4-43) side of wheel up.

(6) Use a tire tool or suitable pry bar and force it between lock ring and the flange. Working around the circumference, pry the lock ring from the flange (fig. 4-44).

(7) Remove preformed packing (fig. 4-43) from groove in wheel and slide the tire (fig. 4-43) from wheel. Use a leather or plastic mallet to loosen tire from wheel if necessary.

c. Cleaning, Inspection, and Repair

(1) Remove all dirt and accumulated grease from tire and wheel.

(2) Inspect exterior of tire for cuts and abrasions. Remove all foreign material from tire treads.

(3) Inspect interior of tire for cuts, abrasions, sharp objects and protrusions. Inspect wheel and flange contact surface of tire for tears, rips and other damage.

(4) Inspect wheel and flange for dents, cracks and other damage.

(5) Inspect valve, cap and adapter for damage, particularly to threaded areas.

(6) Replace all defective or unserviceable parts.

d. Installation

(1) Lubricate tire beads and wheel tire surfaces with soapy water. Lubricate flange area with soapy water.

(2) Place wheel (fig. 4-43) on suitable supports with preformed packing end up. Install tire on wheel.

(3) Lubricate preformed packing (4-43) and install in groove on wheel. Slide flange (fig. 4-43) on wheel rim, being careful not to damage preformed packing.

(4) Install lock ring (fig. 4-43) over flange and tap into place with a soft hammer.

(5) Install valve (fig. 4-43) and adapter in wheel.

Warning: **Install safety cables or tire band around tire and through wheel or use an inflation cage around tire to avoid possible injury to personnel while inflating tire.**

(6) Inflate tire through adapter. Use a high pressure, rapid air flow for the initial inflation to seal the tire to wheel. Inflate tire to 60 psi to seat tire completely on wheel. Deflate tire to 45 psi and install valve cap.

(7) Use a suitable hoist and install tire and wheel in place on wheel hub. Secure wheel with 10 wheel nuts (fig. 3-13).

(8) Torque wheel nuts to 380 to 420 foot-pounds. Operate loader and check wheel nut torque every two hours until it stabilizes at the required figure.

Section XVI. MAINTENANCE OF STEERING SYSTEM

4-52. General

The hydraulic steering is composed of a section of the hydraulic pump supplying pressure, two hydraulic cylinders providing the articulation and a steering wheel and column. On the lower end of the steering column is a steering gear valve. Movement of the steering wheel allows the valve to open and deliver hydraulic oil under pressure to the appropriate cylinder ports. A flow divider valve meters the oil to prevent an excessive supply of oil to the steering system.

4-53. Steering Wheel

a. Removal. Remove button (fig. 4-44) from center of steering wheel. Remove nut from steering column. Use a suitable puller and pull the steering wheel from the shaft.

b. Inspection. Inspect steering wheel for cracks or other damage. Replace defective wheel.

c. Installation. Install steering wheel (fig. 4-44) on shaft and install nut. Tighten nut to 15 to 25 foot-pounds to press wheel on shaft.

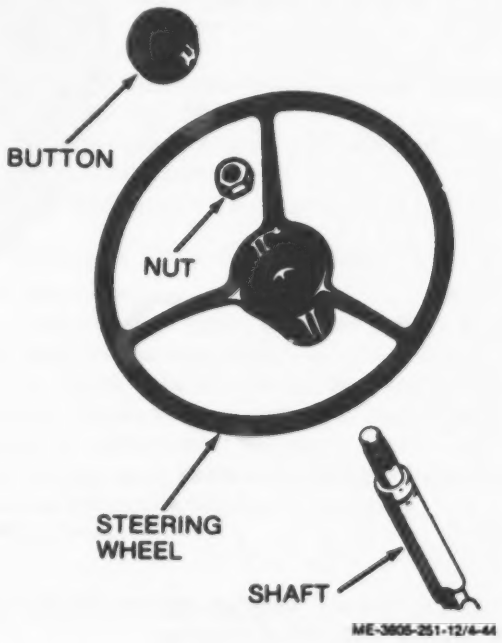


Figure 4-44. Steering wheel, removal and installation

4-54. Hoses, Lines and Fittings

a. Inspect hoses, lines and fittings at steering valve and cylinders for cracks, deterioration, damage and leaks.

b. Tighten connections if possible. Replace defective components.

Section XVII. MAINTENANCE OF BODY

4-55. Hood and Fenders

a. Removal.

(1) To remove a rear fender, remove eight screws, nuts, flat washers and lock washers securing fender to frame.

(2) To remove a front fender, remove six screws, nuts and lock washers securing fender to braces.

(3) To remove the hood, proceed as follows:

(a) Remove exhaust pipe (para 4-22) and air cleaner (para 4-21).

(b) Remove engine side panels.

(c) Remove three screws and flat washers securing left and right hand hoods together at the center top.

(d) Remove nine screws and lock washers securing front of hoods to frame.

(e) Remove four screws and lock washers securing rear top of hoods to frame. Remove six screws, nuts, flat washers and lock washers securing sides of hoods to grille frame.

(f) Remove four screws, nuts, flat washers and lock washers securing bottom center of hoods to hood supports.

(g) Remove left hand of hood first. Remove right half of hood.

b. Cleaning, Inspection and Repair.

(1) Clean hood and fenders with water and detergent.

(2) Inspect hood and fenders for dents, cracks and other damage.

(3) Straighten dents if possible. Weld cracks and grind welds smooth. Paint bare surface. Refer to TM 9-213.

(4) Replace all unserviceable parts.

c. Installation. Install hood and fenders in reverse order of removal. Install exhaust pipe (para 4-22) and air cleaner (para 4-21).

4-56. Operator's Seat

a. General. The operator's seat is mounted in the center of the operator's compartment. It is so situated to give easy access to all controls and instruments. The seat is adjustable vertically and horizontally.

b. Removal

(1) Remove four wing bolts (fig. 4-45) and lock washers securing seat assembly (fig. 4-45) to seat pedestal. Remove two screws, nuts and lock washers securing seat belts to rear of operators compartment. Remove seat belts.

(2) Remove two large bolts (fig. 4-45) and remove seat assembly from seat mount.

(3) Remove four nuts and lock washers securing seat assembly to tilt adjustment (fig. 4-45) and remove seat assembly.

(4) Remove four cap screws and remove seat assembly from slide adjusters (fig. 4-45).

(5) Remove two screws and flat washers from beneath seat shell and remove seat cushion from shell.

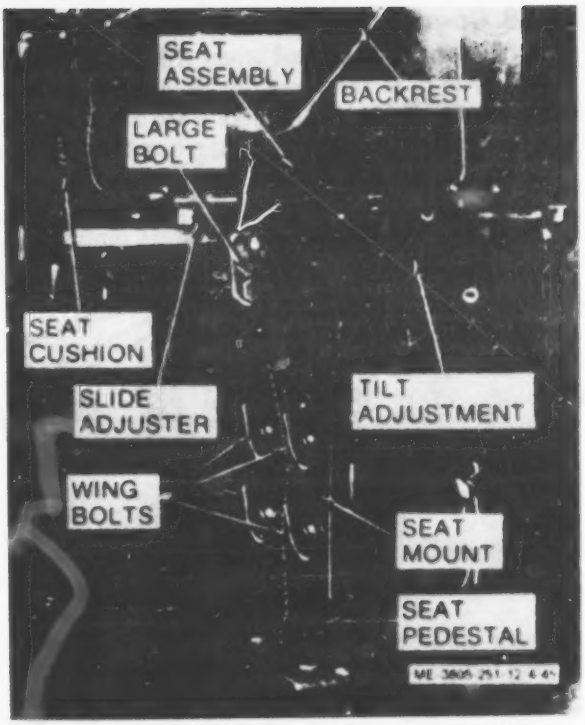


Figure 4-45. Seat assembly, removal and installation.

Remove five screws and flat washers and remove backrest from shell.

c. Repair

(1) Repair torn covers on cushion or backrest with mending tape. Replace unserviceable items.

(2) Inspect seat tilt adjustment for bent frame, damaged locking bar and bent or damaged adjustment slots. Straighten if possible.

(3) Check adjusting slides for bent and damaged condition. Straighten if possible.

(4) Replace unserviceable parts.

d. Installation. Install the seat in reverse order of removal.

Section XVIII. MAINTENANCE OF HYDRAULIC SYSTEM

4-57. General

The loader hydraulic system (fig. 1-4) provides power to lift the boom and to open, close, dump and retract the bucket. It also provides power to steer or articulate the loader. The lift and bucket operations consist of the rear section of the pump, a control valve and lift and bucket cylinders. The steering system utilizes the forward section of the pump, a steering control valve actuated by the steering wheel and two steering cylinders. Both systems are supplied by the hydraulic reservoir mounted at the forward part of the frame. The hydraulic system is pressurized by the air system.

4-58. Control Levers and Linkage

a. General. Two control levers (fig. 2-7) allow the operator to raise and lower the boom and open, close and retract the bucket. The levers are connected by a linkage to the control valve mounted on the right side of the loader beneath the operator's compartment.

b. Removal.

(1) Loosen nuts and remove bucket control lever (fig. 4-46) and boom control lever from linkage.

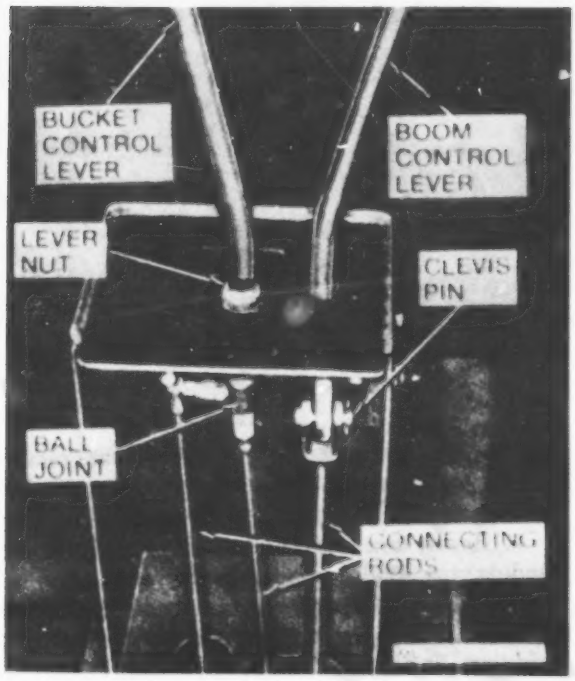


Figure 4-46. Control levers, removal and installation

(2) Remove cotter pins and clevis pins at both ends of boom control lever connecting rod (fig. 4-46) and remove connecting rod.

(3) Remove nuts and lock washers and remove four ball joints from levers and bell cranks at both ends of bucket control lever connecting rods (fig. 4-46).

(4) Remove six cotter pins and clevis pins and disconnect bucket, clam and boom connecting rods (fig. 4-47) from bell cranks and control valve.

c. Installation. Install linkage and levers in reverse order of removal.

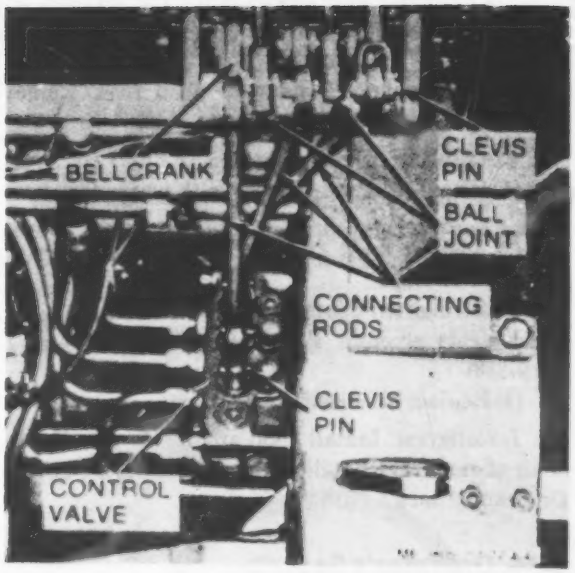


Figure 4-47. Control lever connecting rods, removal and installation

d. Adjustment.

(1) Start engine and operate hydraulic system. Move control levers (fig. 2-7) through all bucket and boom operations. Check movement of spools in control valve and boom and bucket for correct operation.

(2) Adjust length of connecting rods (fig. 4-47) by disconnecting from control valve and bell cranks (*b* (4) above). Loosen clevis lock nuts and shorten or lengthen connecting rods by moving clevis on rod. Adjust length of connecting rods to position valve spools for proper operation. Tighten lock nuts to hold clevis after adjustment.

(3) Place both control levers in neutral and allow engine to run. If spools are positioned correctly there should be no movement or chatter in any of the cylinders: Adjust if necessary.

e. Return to Dig Linkage

(1) *General.* The return to dig linkage, mounted on the right tilt cylinder (fig. 4-48) automatically returns the bucket to level or digging position after dumping load. Two pointers, one mounted on the cylinder rod and the other on the bellcrank, indicate bucket position. When the two pointers are in line the bucket is level with the ground. A switch, mounted at the rear of the linkage, actuates the tilt solenoid and positions the valve spool to return the bucket to level position.

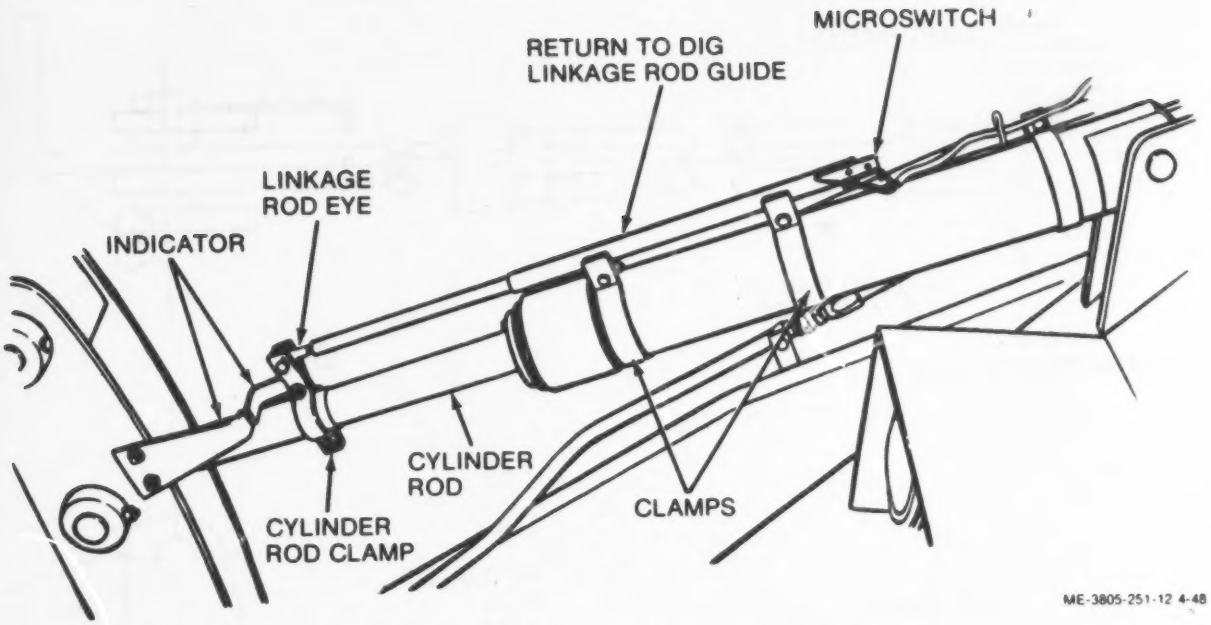


Figure 4-48. Return to dig linkage, removal and installation

(2) *Removal.*

(a) Tag and disconnect two wires to the dig microswitch (fig. 4-48).

(b) Remove two screws, nuts and lock washers securing switch to rod guide. Remove switch.

(c) Remove two screws, nuts and lock washers securing indicator to bellcrank. Remove indicator.

(d) Remove cotter pin and clevis pin securing linkage rod (fig. 4-48) to clamp on cylinder rod. Remove two screws, nuts and lock washers and spacers securing rod guide (fig. 4-48) to cylinder clamps. Remove rod guide, linkage rod and clamps from cylinder.

(e) Remove clamp and indicator from cylinder rod (fig. 4-48).

(3) *Installation.* Install the return to dig linkage and switch in reverse order of removal.

(4) *Adjustment.*

(a) Rest bucket flat on the floor.

(b) Loosen cylinder clamps and aline rod guide on the actuator rod.

(c) Loosen actuator rod clamp (fig. 4-49) and slide clamp along cylinder rod to bring center of rod eye fourteen inches from center of bellcrank as shown in figure 4-49.

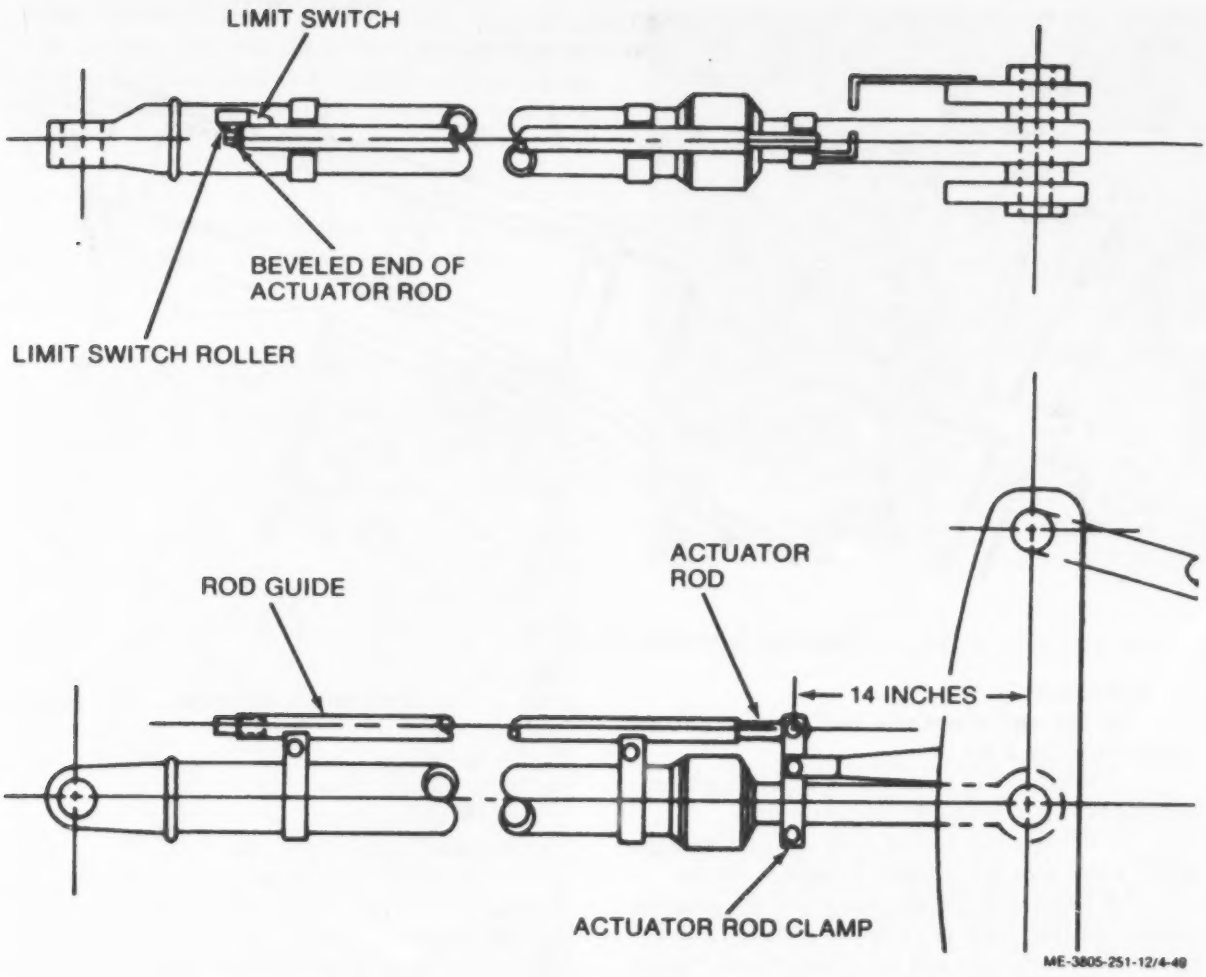


Figure 4-49. Return to dig linkage adjustment.

(d) Position rod guide and clamps on cylinder with beveled end of actuator rod contacting the switch roller but not moving roller.

(e) Aline rod guide on actuator rod and tighten clamp screws on cylinder clamps.

(f) Operate loader and raise bucket to full height and dump bucket. Place bucket control lever (fig. 2-7) in "RETRACT" position and move boom control lever to "FLOAT" position. As bucket lowers to ground it should return automatically to level or dig position.

f. Bucket Height Control

(1) *General.* The bucket height control is mounted on the left side of the operator's compartment (fig. 2-7). The control lever may be set to automatically raise and stop the bucket at the same height each working cycle.

(2) *Removal*

(a) Tag and disconnect two wires from microswitch (5, fig. 4-50). Remove two screws (1), flat washers (2), lock washers (3) and nuts (4) and remove microswitch.

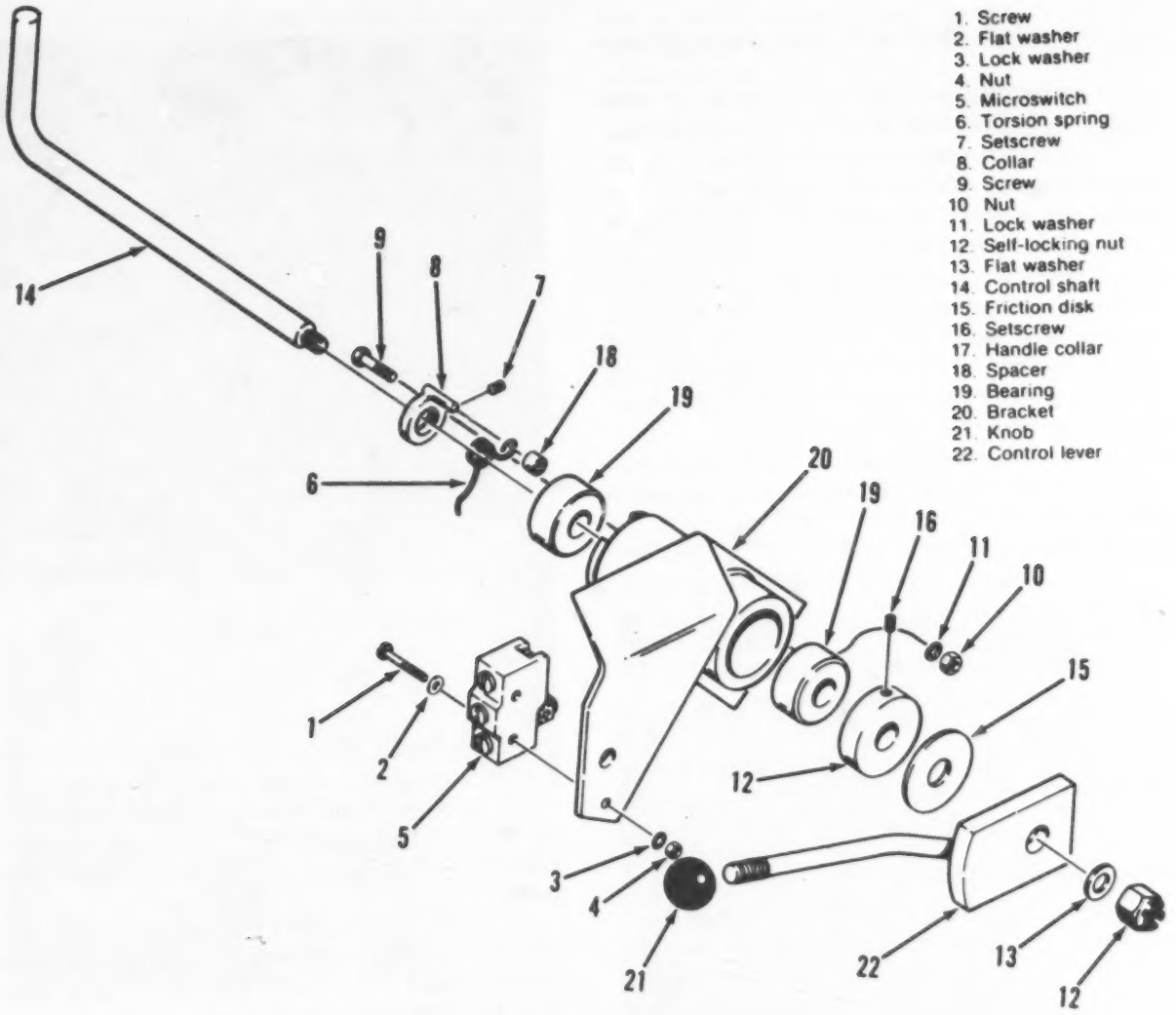


Figure 4-50. Height control, exploded view

(b) Disconnect spring (6) from linkage. Loosen setscrew (7) in shaft collar (8).

(c) Remove two screws (9), nuts (10) and lock washers (11) and slide height control assembly from wall of operator's compartment.

(3) *Disassembly*

(a) Remove self-locking nut (12, fig. 4-50) and flat washer (13). Remove setscrew (16) and remove control shaft (14), friction disk (15) and collar (17). Remove spacer (18) and collar (8).

(b) Remove knob (21) from control lever (22).

(c) If bearings (19) require replacement, press bearings from bracket (20).

(4) *Cleaning, Inspection and Repair*

(a) Clean all parts in solvent and dry thoroughly.

(b) Inspect shaft and bearings for wear and damage.

(c) Inspect friction disk for wear and damage.

(d) Check operation of microswitch.

(e) Replace defective parts.

(5) *Assembly*

(a) Install knob (21, fig. 4-50) on control lever.

(b) If bearings (19) were removed, install new bearings by pressing into bore of bracket (20). Press bearings until flush with ends of bore. Install shaft

(14) in bearings. Shaft must rotate freely. Remove shaft.

(c) Install spacer (18) and spring (6) on collar (8). Install shaft through collar, spring and bracket.

(d) Install handle collar (17) and setscrew (16) on shaft. Install friction disk (15) and control lever (22) on end of shaft and secure with self-locking nut (12) and flat washer (13).

(e) Install knob (21) on control lever. Slide control shaft through mounting hole in wall of compartment and secure with two screws (9), nuts (10) and lock washers (11). Use shims, if required, to make lever end of shaft (14) properly contact height control pin in lift arm.

(f) Install microswitch (5) on bracket and secure with two screws (1), flat washers (2), lock washers (3) and nuts (4).

(6) *Adjustment.*

(a) Loosen setscrew (7, fig. 4-50) in collar (8). With lift arm down, pivot lever end of shaft (14) forward.

(b) Raise lift arms to maximum height.

(c) Hold control shaft against lift arm control pin in lift arm. Lower lift arm until top of control shaft lever is 0.01 inch above the control point between the lever and control pin.

(d) Tighten collar setscrew.

4-59. Hydraulic Cylinders

a. General. Operation of loader functions are powered by the lift, tilt, and clamp cylinders. The lift cylinders raise and lower the boom. Tilt cylinders tilt the bucket for digging and loading operations. The clam cylinders open and close the multi-purpose bucket.

b. Lift Cylinders.

(1) *Removal.*

(a) Lower bucket to ground. Operate boom control lever back and forth to relieve hydraulic pressure.

(b) Refer to paragraph 4-54 and remove front fenders to gain access to boom cylinder.

(c) Disconnect two hydraulic lines (fig. 4-51) from cylinder. Remove fittings and preformed packings from cylinder. Discard preformed packings. Plug lines and cylinder to prevent entrance of foreign matter.

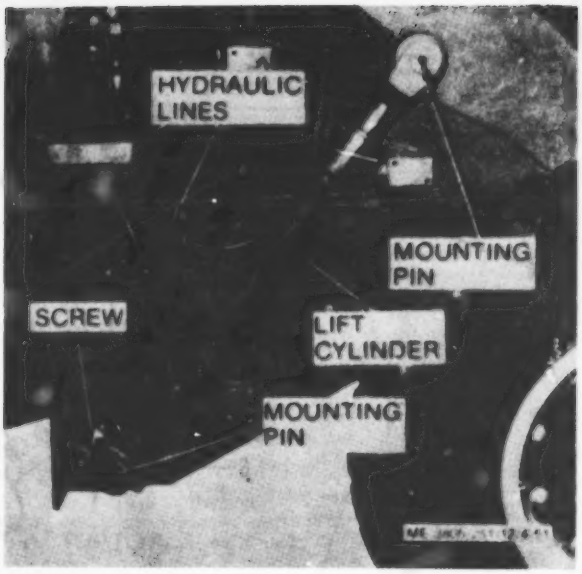


Figure 4-51. Lift cylinder, removal and installation

(d) Attach a suitable hoist to cylinder to support cylinder when mounting pins are removed.

(e) Remove self-locking nut and screw from cylinder rod and mounting pin (fig. 4-51) at top of cylinder. Remove mounting pin from cylinder and frame.

(f) Remove self-locking nut and screw from lower end of cylinder and pivot pin (fig. 4-61) on both sides of loader. Use a brass hammer or large brass drift and drive pivot pin through cylinder and into frame far enough to free cylinder.

(g) Use hoist and lift cylinder from loader and place supports in a clean work area.

(h) Remove remaining lift cylinder in same manner.

(2) *Installation.* Raise cylinder into place using a suitable hoist. Install cylinder and fender in reverse order of removal. Operate loader and check cylinder operation and hydraulic lines for leaks.

c. Tilt Cylinder

(1) *Removal*

(a) Lower bucket to ground. Operate bucket control lever back and forth to relieve hydraulic pressure.

(b) Before attempting to remove right tilt cylinder, remove return to dig linkage from cylinder (para 4-57). Remove floodlights, signal lights and blackout headlight and light guards from both sides of loader (para 4-37).

(c) Disconnect hydraulic line (fig. 4-52) from curved tube at top of cylinder. Disconnect hydraulic line from straight tube. Plug hydraulic lines.

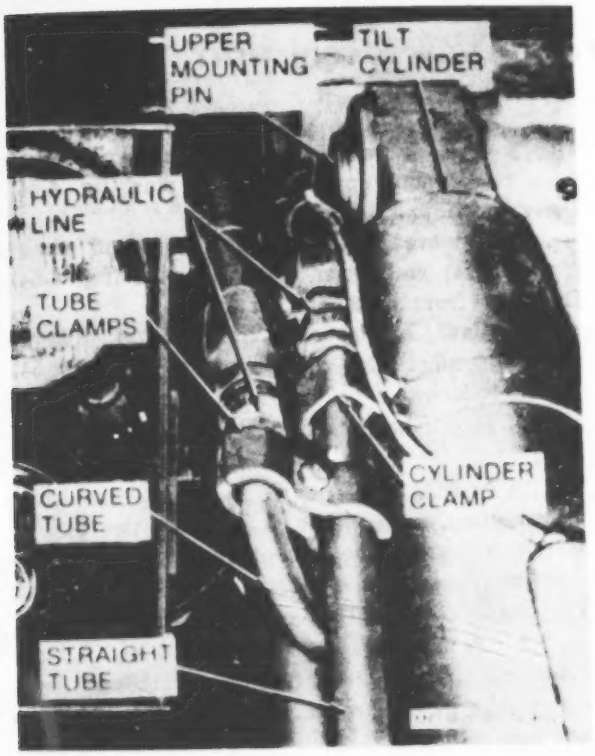


Figure 4-52. Tilt cylinder, removal and installation

(d) Remove screw, nut and lock washer and remove two tube clamps (fig. 4-52) securing tubes together. Remove two screws, nuts and lock washers securing cylinder clamp (fig. 4-52) to cylinder and tube. Remove clamps.

(e) Disconnect curved tube from elbow in top of cylinder. Remove elbow and preformed packing from cylinder. Discard preformed packing. Disconnect straight tube from fitting at lower end of cylinder. Remove fitting and preformed packing. Discard preformed packing. Plug cylinder openings.

(f) Support cylinder with a suitable hoist before removing mounting pins.

(g) Remove retaining rings and special washers from both sides of upper mounting pins (fig. 4-52). Use a brass hammer or large brass drift and drive mounting pin through frame and cylinder far enough to free cylinder.

(h) Remove self-locking nut and screw from bellcrank and pin at lower end of cylinder. Remove mounting pin and hoist cylinder from loader.

(2) *Installation.* Install cylinder and connect hydraulic lines in reverse order of removal. Install floodlight guards and install floodlights, signal lights and blackout headlight (para 4-37). Operate loader and check cylinder operation and hydraulic lines for leaks.

d. Clam Cylinder

(1) *Removal.*

(a) Lower bucket to the ground. Operate bucket control lever from side to side to relieve hydraulic pressure.

(b) Disconnect two hydraulic hoses (fig. 4-53) from hydraulic cylinder. Plug hoses to prevent entrance of foreign matter.

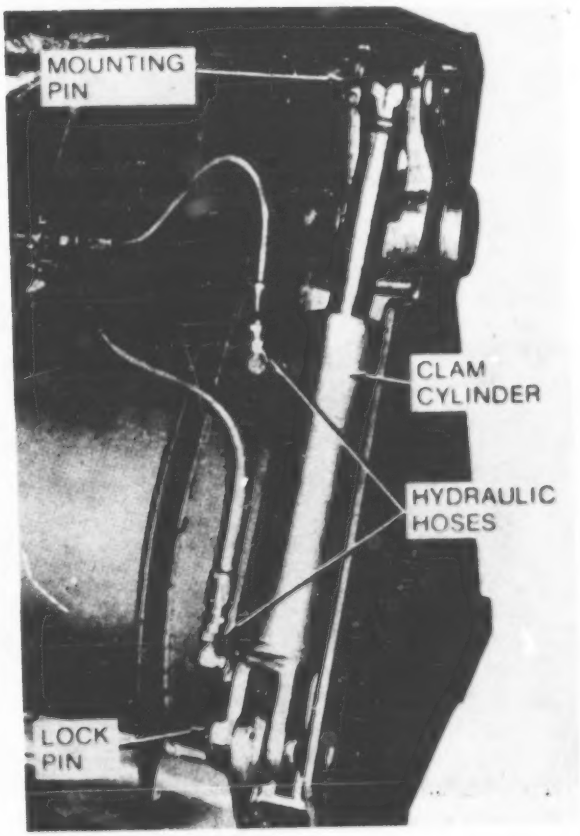


Figure 4-53. Clam cylinder, removal and installation

(c) Remove two elbows and preformed packings from cylinder. Discard preformed packings. Plug cylinder ports to prevent entrance of foreign matter.

(d) Attach a suitable hoist to cylinder before removing mounting pins. Lift cylinder to take tension off mounting pins.

(e) Remove two cotter pins and lock pins and remove mounting pins (fig. 4-53) from bucket, clam and cylinder. Lift cylinder from loader using hoist.

(2) *Installation.* Install the clam cylinders in reverse order of removal. Operate loader and check cylinder operation. Check hydraulic lines for leaks.

Section XIX. MAINTENANCE OF EARTH MOVING EQUIPMENT

4-60. General

a. The multi-purpose bucket is mounted by pins to the lift arms and tilt linkage. Hydraulic cylinders lift and move the arms and linkage to operate the bucket loading functions.

b. Clam cylinders open and close the clam to provide loading and unloading operation. The cylinders are also used to position the clam for the multi-purpose action.

4-61. Bucket

a. Removal

(1) Refer to paragraph 4-58 and remove clam cylinders.

(2) Disconnect two hydraulic hoses (fig. 4-54) from tees in tubes at rear of bucket.

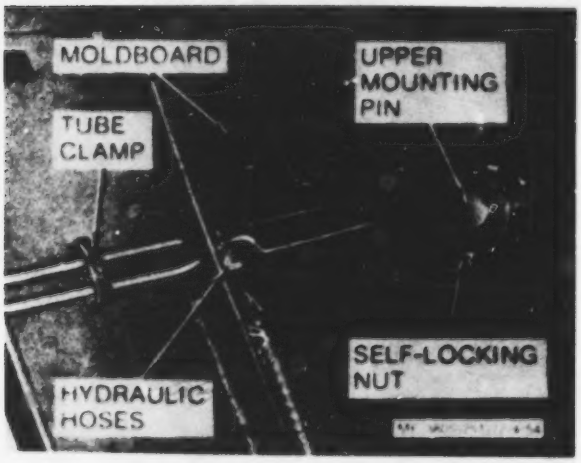


Figure 4-54. Loader bucket, removal and installation

(3) Remove two self-locking nuts and screws from bucket and upper mounting pins (fig. 4-54). Drive pins from link arm and bucket.

(4) Remove two self-locking nuts and screws from bucket and lower mounting pins (fig. 4-54). Drive pins from bucket and lift arm.

(5) Back loader away from bucket. Remove hoses and tubes from rear of moldboard (fig. 4-54).

b. Installation

(1) Install hoses and tubes on moldboard (fig. 4-54).

(2) Position bucket to allow loader to be driven into position. Guide lift arms into position and install two lower mounting pins (fig. 4-69). Secure mounting pins with screws and self-locking nuts at inside of moldboard flange.

(3) Lift link arms into position and install upper mounting pins (fig. 4-69) through moldboard flange and link arm. Secure mounting pins with screws and self-locking nuts at inside of moldboard flange.

(4) Connect two hydraulic hoses (fig. 4-54) to tees at rear of moldboard.

(5) Refer to paragraph 4-58 and install the clam cylinders.

(6) Operate loader and bucket through all cycles. Check for proper operation. Check hydraulic lines for leaks.

4-62. Bucket Teeth

a. Removal

(1) Lower bucket to suitable supports to hold bucket edge 6 to 12 inches off the ground.

(2) To remove tooth point (fig. 4-55) from shank, drive large spring pin (fig. 4-55) from tooth and shank.

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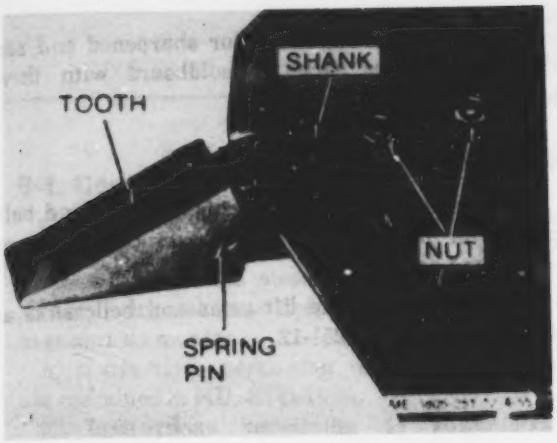

Figure 4-55. Bucket teeth, removal and installation

(3) To remove tooth shank (fig. 4-55), remove tooth ((2) above) in necessary. Remove two nuts and screws securing tooth shank to clam and remove shank.

b. Installing. Install tooth shanks and tooth points in reverse order of removal.

4-63. Moldboard Cutting Edge

a. General. The moldboard cutting edge is installed in three sections, a center section and two end sections. Cutting edge sections are reversible. If edge becomes dull, remove edges as described in *b* below, reverse sections and install in place, *c* below.

b. Removal

(1) Open clam (fig. 4-56) and place suitable supports under clam to support it while removing cutting edges.

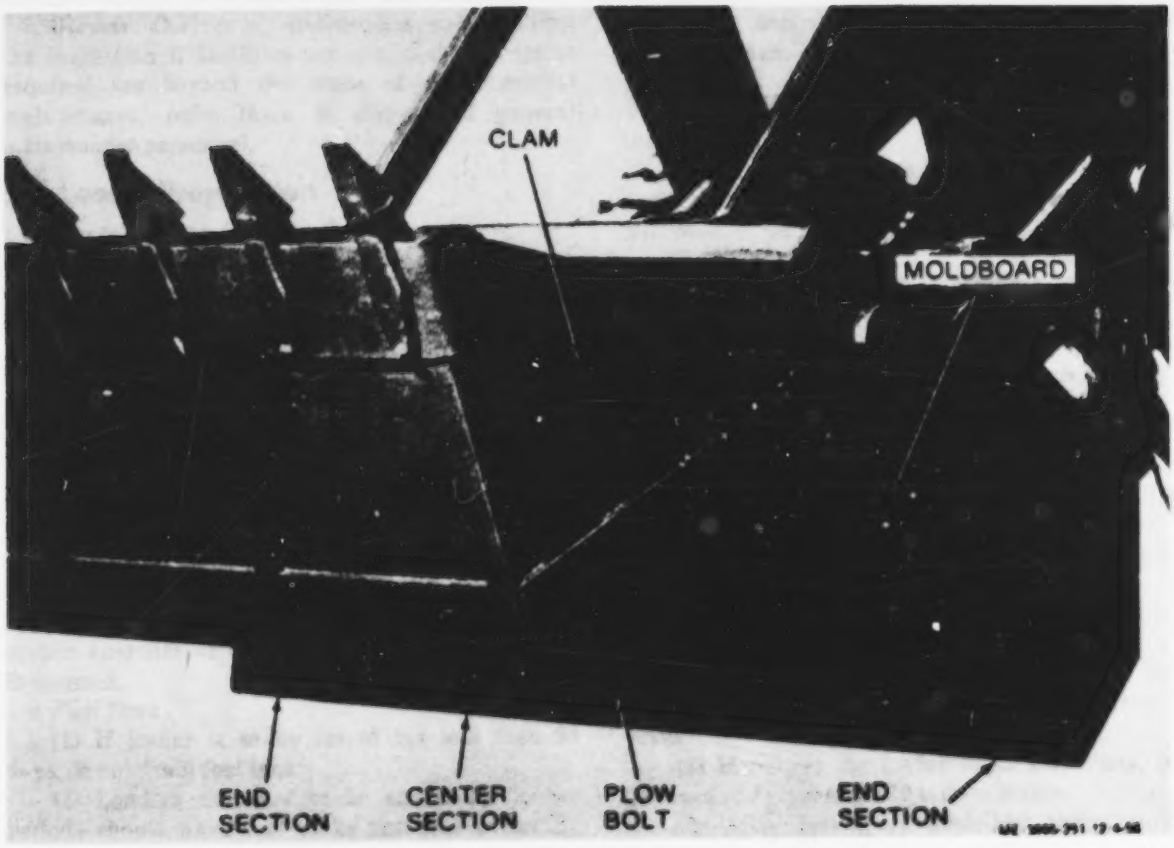

Figure 4-56. Moldboard cutting edges, removal and installation

(2) Remove three plow bolts (fig. 4-56) and nuts and remove either end section (fig. 4-56) from moldboard.

(3) Remove thirteen plow bolts and nuts and remove center section (fig. 4-56).

c. Installation

(1) Reverse center section (fig. 4-57) or if both edges are worn, install new or sharpened center section in place and secure with thirteen plow bolts and nuts.

(2) Reverse end sections (fig. 4-57) or if both edges are worn, install new or sharpened end sections and secure each to moldboard with three plow bolts (fig. 4-57) and nuts.

4-64. Lift Arms

a. Inspection. Inspect lift arms (fig. 1-1) and bellcranks for proper mounting, security of pins and screws and damage.

b. Service. Lubircate lift arms and bellcranks as shown on LO 5-3805-251-12.

CHAPTER 5
ADMINISTRATIVE STORAGE

5-1. General

a. Instructions in this chapter apply to the loader to make it available for immediate use upon receipt after shipment. The storage instructions apply to loaders being taken out of service for a period not to exceed six months.

b. Instructions pertaining to overseas shipment are contained in MIL-STD-162A.

c. Instructions pertaining to administrative storage are covered in TM 740-90-1.

5-2. Preparation for Shipment or Storage

a. Inspection. Perform preventive maintenance services listed in paragraph 3-5 and table 3-1.

b. Repair. Correct all deficiencies noted during the inspection if facilities are available. If repairs required are beyond the scope of organizational maintenance, refer them to direct and general maintenance personnel.

5-3. Loader Preparation

a. Electrical System

(1) Disconnect battery ground cable and tap end of cable to prevent accidental discharge. Use tape, adhesive (FSN 7510-269-8090).

(2) Do not remove battery from loader. Attach tag to steering wheel to alert personnel that battery ground cable has been disconnected.

b. Cooling System.

(1) Follow instructions in paragraph 3-11 and flush the cooling system with clear water and drain system.

(2) If rust appears in the system use cleaning compound.

(3) After flushing and draining, fill system with proper amounts of coolant and corrosion inhibitor compound.

c. Fuel Tank

(1) If loader is to be stored for less than 90 days, do not drain fuel tank.

(2) Loaders that are to be stored for longer periods should have fuel tanks prepared according to instructions in MIL-STD-162A and Specification MIL-E-10062A.

d. Cleaning and Painting

(1) Wash loader and remove debris from floor and engine compartment.

(2) Remove rust and corrosion, scrape any flaked and peeling paint. Dry all surfaces to be painted or coated with preservatives.

(3) Repaint surfaces as required to protect against deterioration. Refer to TM 9-213.

(4) Coat all exposed metal surfaces with Oil, Preservative (PL Medium).

(5) Clean all tires thoroughly to remove all grease and lubricants.

e. Accessories.

(1) Remove seat, cushion, backrest cushion, floodlights, headlight, singal lights, stop and taillight, and fire extinguisher from loader. Store all these accessories in a box, mark box with the loader serial number, and fasten box securely to the loader.

(2) Secure side panels and seal joints with tape. Seal front access panel and hydraulic oil cooler grille with tape.

5-4. Storage Instructions

a. General.

(1) Provide access to the loader during storage. Do not block the wheels but be sure tires are not resting on surfaces containing grease or oil.

(2) If the loader is to be stored outside, cover it with a tarpaulin or other means to provide protection against the weather.

(3) During storage, inspect and operate the loader at the intervals and in the manner described below.

b. Fifteen to Thirty Days.

(1) While in storage, inspect the loader and operate it (for 15 to 20 minutes) one or more times each 15 to 30 days.

(2) Check loader for leaks and proper functioning of components.

c. Thirty Days. In addition to the services of *b* above, perform the following every 30 days.

(1) Test each loader under full load and check hydraulic and fuel systems and fuel pump for leaks.

(2) Maneuver the loader in all directions, both forward and reverse for 10 to 15 minutes.

(3) After testing as described above, correct deficiencies as described in paragraph 5-2 *b*.

d. 180 Days. Perform 15 and 30 day services and the following every 180 days. Correct any deficiencies found during the procedures as described in paragraph 5-2 *b*.

(1) Adjust the drive belts (para 4-26) and clean the fuel pump strainer (para 4-17) if necessary.

(2) Check alinement, steering operation, and

transmission shift mechanism.

(3) Check parking brake linkage. Check and tighten service brake hydraulic lines if necessary.

(4) Lubricate the loader thoroughly in accordance with LO 5-3805-251-12.

(5) Inspect all electrical connections and tighten or adjust if necessary. Spray ignition insulating compound (U.S. Army Specification No. 3-182) on alternator, starter, and wiring.

APPENDIX A
REFERENCES

A-1. Fire Protection

TM 5-687	Repairs and Utilities: Fire Protection Equipment and Appliances; Inspection, Operations, and Preventive Maintenance.
TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users.

A-2. Lubrication

C9100-IL	Identification List for Fuels, Lubricants, Oils and Waxes.
LO 5-3805-251-12	Loader, Scoop Type, DED, 4 Wheel Drive, Pneumatic Tired, Hinged Frame Steer, 2-1/2 cu. yd. Multi-Purpose Bucket.

A-3. Painting

TM 9-213	Painting Instructions for Field use.

A-4. Radio Suppression

TM 11-483	Radio Interference Suppression.

A-5. Maintenance

TB 750-651	Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems.
TM 9-2610-200-20	Organizational Care, Maintenance and Repair of Pneumatic Tires and Inner Tubes.
TM 9-6140-200-14	Operator, Organizational, DS and GS Maintenance Manual: Storage Batteries Lead-Acid Type.
TM 38-750	The Army Maintenance Management Systems.
TM 5-3805-251-20P	Organizational Maintenance Repair Parts and Special Tools List: Loader, Scoop Type, DED, 4 Wheel Drive, Pneumatic Tired, Hinged Frame Steer, 2-1/2 cu. yd. Multi-Purpose Bucket (J.I. Case Model MW24B) FSN 3805-169-4711 (When Printed)

A-6. Shipment and Storage

TB 750-97-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage.
TM 740-90-1	Administrative Storage of Equipment.

A-7. Destruction To Prevent Enemy Use

TB 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use.

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at the various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the third position of the SMR code.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. Explanation of Columns in the MAC, Section II

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next

higher assembly. End item group number shall be "00."

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For a detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a *work time* figure in the appropriate subcolumn(s), the level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The symbol designations for the various maintenance levels are as follows:

C ..... Operator or Crew
O ..... Organizational Maintenance
F ..... Direct Support Maintenance
H ..... General Support Maintenance
D ..... Depot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National or NATO Stock Number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. Explanation of Columns in Remarks, Section IV

a. Column 1, Reference Code. The code recorded in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
01	ENGINE								
0100	Engine Assembly	Test			1.5				A
		Service	1.0						
		Replace			9.5				
		Repair				2.0			
		Overhaul				60.0			
	Engine, Mounting	Replace			2.0				
0101	Crankcase, Block, Cylinder Head								
	Cylinder, Block	Replace			9.5				
		Repair				5.0			
	Cylinder, Head	Replace			9.0				
		Repair				10.0			
		Overhaul				12.5			
0102	Crankshaft	Inspect				0.5			
		Replace				16.0			
		Overhaul				18.0			
0103	Flywheel Assembly	Replace			16.0				
		Repair			16.5				
	Flywheel Housing	Replace			11.0				B
0104	Pistons and Connecting Rods								
	Connecting Rods	Replace				14.0			
		Repair				15.0			
	Pistons	Replace				14.0			
0105	Valves, Camshafts, and Timing System								
	Rocker Arm Assembly	Adjust			1.0				
		Replace			3.0				
		Repair			4.0				
	Valves	Replace				4.0			
	Camshaft	Replace				6.0			
	Timing Gears	Replace				15.5			
0106	Engine Lubrication System								
	Oil Pan	Replace			10.0				
	Engine Oil Pump	Replace			10.5				
		Repair				1.0			

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
0106	Engine Lubrication System (Continued)								
	Filter, Oil	Service		0.3					
		Replace		1.0					
	Cooler, Oil	Replace			1.0				
0108	Manifolds								
	Manifold, Exhaust	Replace			4.3				
	Manifold, Intake	Replace			3.0				
03	**FUEL SYSTEM**								
0301	Fuel Injector	Test			1.0				
		Replace			1.0				
		Repair					1.0		
		Overhaul					2.0		
0302	Fuel Pumps								
	Fuel Tank Pump	Replace		0.5					
		Repair			2.0				
	Fuel Injection Lines	Replace		1.0					
	Fuel Injection Pump	Adjust			1.0				
		Replace			1.5				
		Repair			2.0				
		Overhaul			2.5				
	Fuel Transfer Pump	Replace		0.5					
		Repair			1.0				
0304	Air Cleaner	Service	0.2						
		Replace		0.8					
0305	Turbocharger	Replace			1.5				
		Repair				2.0			
		Overhaul				3.0			
0306	Tanks, Lines, Fittings, Headers								
	Fuel Tank Assembly	Service	0.5						
		Replace		2.5					C
		Repair		2.0					
	Shut-Off Controls	Align		0.5					
		Replace		1.0					
		Repair		1.0					

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
03	**FUEL SYSTEM (Continued)**								
0308	Engine Speed Governor and Controls								
	Governor, Fuel Injection	Adjust			1.0				
		Replace				1.0			
		Repair				3.5			
		Overhaul				3.0			
0309	Fuel Filters	Service		0.5					
		Replace		0.5					
0311	Engine Starting Aids								
	Quick Start Kit	Service	0.2						
		Replace		0.4					
		Repair		0.5					
0312	Accelerator, Throttle or Choke Control								
	Throttle Control	Replace		1.0					
		Repair		2.0					
04	**EXHAUST SYSTEM**								
0401	Muffler and Pipes								
	Exhaust Pipe	Replace		2.0					
05	**COOLING SYSTEM**								
0501	Radiator, Evaporative Cooler, or Heat Exchanger								
	Radiator	Service		0.5					
		Replace		4.0					
		Repair			5.0				
	Grille	Replace		1.0					
0503	Water Manifold, Headers, Thermostats and Housing Gasket								
	Manifold, Water	Replace		0.8					
0504	Water Pump	Replace		2.5					
		Repair			1.0				
0505	Fan Assembly	Replace		1.5					

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
06	ELECTRICAL SYSTEM								
0601	Generator, Alternator								
	Alternator Assembly	Test		0.5					
		Replace		1.5					
		Repair			1.0				
		Overhaul				1.5			
	Connections, Alternator	Replace		1.5					
0603	Starting Motor	Test		0.5					
		Replace		0.5					
		Repair			0.5				
		Overhaul				2.1			
0606	Engine Safety Controls								
	Solenoid Bracket	Replace		1.0					
		Repair		2.0					
0607	Instrument or Engine Control Panel								
	Hourmeter	Replace		0.3					
	Instrument Panel	Inspect	0.2						
		Replace		2.0					
		Repair			1.0				
0608	Miscellaneous Items								
	Switches	Replace		1.0					
	Directional Control	Replace		1.0					
		Repair		2.5					
0609	Lights								
	Floodlights	Inspect	0.5						
		Replace		0.5					
		Repair		0.5					
	Taillights	Inspect	0.2						
		Replace		0.5					
		Repair		0.5					
	Blackout Lights	Inspect	0.2						
		Replace		0.5					
		Repair		0.5					
	Park and Turn Lights	Inspect	0.2						
		Replace		0.5					
		Repair		0.5					
	Headlights	Inspect	0.2						
		Replace		0.5					
		Repair		0.5					

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
06	**ELECTRICAL SYSTEM (Continued)**								
0610	Sending Units and Warning Switches								
	Transmitters	Replace		0.5					
	Warning Buzzer	Replace		1.5					
		Repair		2.0					
0611	Horn, Siren	Replace		1.0					
0612	Batteries, Storage	Inspect	0.2						
		Test		0.4					
		Service		0.2					
		Replace		0.5					
0613	Hull or Chassis Wiring Harness								
	Wiring Harness, Front	Test		1.0					
		Replace			2.5				
	Wiring Harness, Rear	Test		1.0					
		Replace		2.5					
07	**TRANSMISSION**								
0705	Transmission Shifting Components								
	Linkage	Service		1.0					
		Replace		1.5					
0708	Torque Converter or Fluid Coupling								
	Pump Assembly	Replace				9.0			
		Repair				4.0			
	Diaphram Assembly	Replace				2.0			
		Repair				1.0			
	Turbine Assembly	Replace				5.0			
		Repair				2.0			
	Housing Assembly	Replace				1.5			
		Repair				2.0			
0710	Transmission Assembly	Service		0.5					
		Replace			8.0				
		Repair			10.0				
		Overhaul				21.0			

Section II. MAINTENANCE ALLOCATION CHART – Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
0710	Transmission Assembly (Continued)								
	Mounting	Replace			1.0				
		Repair			0.5				
	Transmission Parking Brake	Replace			2.0				
		Repair			2.0				
0713	Intermediate Clutch								
	Positioner, Clutch	Replace				3.0			
		Repair				1.5			
	Carrier Assembly	Replace				2.5			
		Repair				1.0			
	Gear Assembly Drive	Replace			3.0				
		Repair			1.0				
	Housing, Mechanical	Replace			1.5				
		Repair			3.0				
0714	Servo Unit Control Valve	Replace			1.0				
		Repair				2.0			
		Overhaul				3.5			
0721	Coolers, Pumps, Motors								
	Filter, Oil	Service		0.3					
		Replace		0.5					
		Repair		1.5					
	Pump, Oil	Replace			9.0				
		Repair				10.0			
		Overhaul				10.0			
09	**PROPELLER, PROPELLER SHAFTS, UNIVERSAL JOINTS, COUPLER AND CLAMP ASSEMBLY**								
0900	Propeller Shafts								
	Front Drive Shaft	Service		0.5					
		Replace			0.5				
		Repair			2.0				
	Center Bearing	Replace		0.5					
	Rear and Intermediate Drive Shaft	Service		0.5					
		Replace			1.5				
		Repair			1.0				

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
10	**FRONT AXLE**								
1000	Front Axle Assembly	Inspect	0.2						
		Service		0.4					
		Replace			5.0				
		Repair				3.0			
1002	Differential	Service		0.5					
		Replace				8.0			
		Repair				8.0			
		Overhaul				10.0			
1003	Planetary or Final Drive	Replace			5.0				
		Repair			7.0				
11	**REAR AXLE**								
1100	Rear Axle Assembly	Inspect	0.2						
		Service		0.4					
		Replace			5.0				
		Repair			6.0				
1102	Differential	Service		0.5					
		Replace				8.0			
		Repair				8.0			
		Overhaul				10.0			
1103	Planetary or Final Drive	Replace			5.0				
		Repair				6.0			
12	**BRAKES**								
1202	Service Brakes	Adjust		0.5					
		Replace			2.0				
		Repair			3.0				
1204	Hydraulic Brake System								
	Wheel Cylinders	Service		0.5					
		Replace			5.0				
		Repair			2.0				
	Master Cylinder	Service		0.2					
		Replace			0.7				
		Repair			1.0				
	Hydraulic Brake Lines	Inspect		0.5					
		Replace			0.3				
		Repair			2.0				

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
12	**BRAKES (Continued)**								
1208	Air Brake System								
	Parking Brake Safety	Replace			2.0				
	Chamber	Repair			1.0				
	Brake Treadle	Replace		1.5					
		Repair			2.0				
	Air Brake Chamber	Replace			0.7				
		Repair			1.5				
	Air Brake Valve	Replace			1.5				
		Repair			1.0				
	Pressure Protection	Replace			1.0				
	Valve	Repair			1.5				
	Clutch Cutout Valve	Replace			1.0				
		Repair			2.0				
	Reservoir Pressure	Replace			0.5				
	Valve	Repair			0.5				
	Pressure Regulating	Replace			0.5				
	Valve	Repair			0.5				
	Alcohol Evaporator	Replace			1.0				
		Repair			0.5				
1209	Air Compressor								
	Assembly	Replace			1.5				
		Repair			2.0				
	Air Intakes	Replace			1.5				
	Governor	Replace			1.0				
		Repair			1.5				
	Lines and Fittings	Replace		1.0					
13	**WHEELS AND TRACKS**								
1311	Wheel Assembly	Replace		0.8					
		Repair		1.5					
1313	Tires, Tubes, Tire Chains								
	Tires	Service	0.3						
		Replace		1.5					
		Repair			0.5				

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
14	**STEERING**								
1401	Mechanical Steering Gear Assembly								
	Steering Column and Gear Assembly	Service		0.5					
		Adjust			1.0				
		Replace			2.0				
		Repair			3.0				
1410	Hydraulic Pump or Fluid Motor Assembly								
	Pump, Rotary	Replace			1.5				
		Repair			3.0				
1411	Hoses, Lines, Fittings								
	Hose Assemblies	Replace		2.0					
		Repair		3.5					
1412	Hydraulic or Air Cylinders								
	Steering Cylinders	Inspect	0.5						
		Replace			1.4				
		Repair			1.0				
		Overhaul			2.4				
1414	Steering System Valves								
	Valve Assembly Ring	Test			1.0			1	D
		Replace			1.0				
		Repair			1.0				
15	**FRAME AND TOWING ATTACHMENTS**								
1501	Frame Assembly								
	Spindle Assembly	Replace			9.0				
		Repair			2.5				
	Rear Trunnion	Replace			3.0				
		Repair			1.0				
	Front Chassis	Replace			3.0				
		Repair			1.5				
1503	Pintles and Towing Attachments								
	Pintle	Replace		0.5					
		Repair		1.5					

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
18	**BODY, CAB AND HOOD**								
1801	Body, Cab and Hood								
	Operators Compartment	Replace		1.5					
	Hoods	Replace		0.2					
1802	Fenders	Replace		1.0					
1805	Floors	Replace		2.0					
1806	Upholstery, Seats								
	Seat Assembly	Replace		0.5					
		Repair		1.0					
	Pedestal Assembly	Replace		1.5					
		Repair		2.0					
1808	Stowage Racks and Boxes								
	Tool Box	Replace		0.5					
22	**BODY, CHASSIS HULL AND ACCESSORY ITEMS**								
2202	Accessory Items								
	Reflectors	Replace		0.5					
	Horn	Replace		0.5					
2210	Data Plates and Instruction Holders								
	Identification Plates	Replace		0.5					
	Engine Serial Number Plate	Replace		0.1					
	Turbocharger Plate	Replace		0.1					
24	**HYDRAULIC AND FLUID SYSTEMS**								
2401	Pump and Motor								
	Hydraulic Pump	Test			1.0			1	D
		Replace			1.5				
		Repair			2.5				
		Overhaul				4.0			

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
24	HYDRAULIC AND FLUID SYSTEMS (Continued)								
2402	Manifold and Control Valves								
	Hydraulic Valve, Loader	Test			1.5			1	D
		Replace			4.0				
		Repair			5.0				
		Overhaul				5.0			
2403	Hydraulic Controls								
	Hydraulic Controls and Linkage	Adjust		1.0					
		Replace		2.0					
	Console Assembly	Replace		1.0					
		Repair		1.0					
	Bucket Height Control	Adjust		0.5					
		Replace		1.5					
		Repair		2.5					
2404	Tilt Cylinders	Inspect	0.5						
		Replace		1.0					
		Repair			2.0				
2405	Mast Column	Inspect	0.5						
		Replace		1.0					
		Repair			2.0				
2406	Strainers, Filters, Lines and Fittings								
	Bucket Lines and Fittings	Replace		1.5					
		Repair		1.0					
	Hydraulic Reservoir	Replace			1.0				
	Lines and Fittings	Repair			2.0				
	Tilt and Lift Cylinder	Replace			3.0				
	Lines and Fittings	Repair			2.5				
	Oil Filter	Replace			0.5				
		Repair			2.0				
2407	Hydraulic Cylinders								
	Clam Cylinder Assembly	Replace		1.0					
		Repair			2.5				

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
2408	Liquid Tanks or Reservoirs								
	Reservoir Assembly	Service		0.3					
		Replace			2.5				
		Repair				2.0			
74	CRANES, SHOVELS AND EARTHMOVING EQUIPMENT COMPONENTS								
7436	Lift Arms and Pivot Assemblies								
	Lift Arms	Service		0.5					
		Replace			5.0				
		Repair			6.0				
7437	Loader Bucket Assembly	Replace		1.5					
		Repair			2.5				

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Tool or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	F	Tester Hyd Cir Ptbl	4910-00-868-68	PT100E

Section IV. REMARKS

(1) Reference Code	(2) Remarks
A	Test includes Engine Operation and Compression Test
B	Replace Ring Gear
C	Service includes Draining Water
D	Pressure Test

APPENDIX C
BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

C-1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the loader and are required by the crew/operator for operation, installation, or operator's maintenance.

C-2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List—Section III. A list in alphabetical sequence of items which at the discretion of the unit commander may accompany the end item, but are NOT subject to be turned in with the end item.

C-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code (s) (SMR): Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

Section II. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description — Ref No. & mfr code	(3) Description — Usable on code	(4) Unit of meas	(5) Qty auth
	4210-889-2221	Extinguisher, Fire: Dry, 1 Hand Type, 2½ lb. Fed Spec. O-E-95, Type III, Class 2, Walter Kidde, P/N 874195 or equal.		EA	1

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